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Safety first

George Bradshaw

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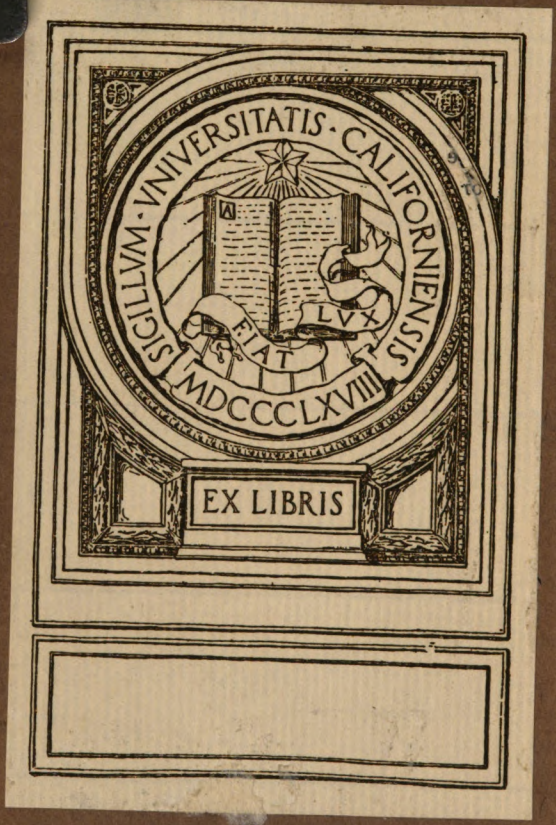

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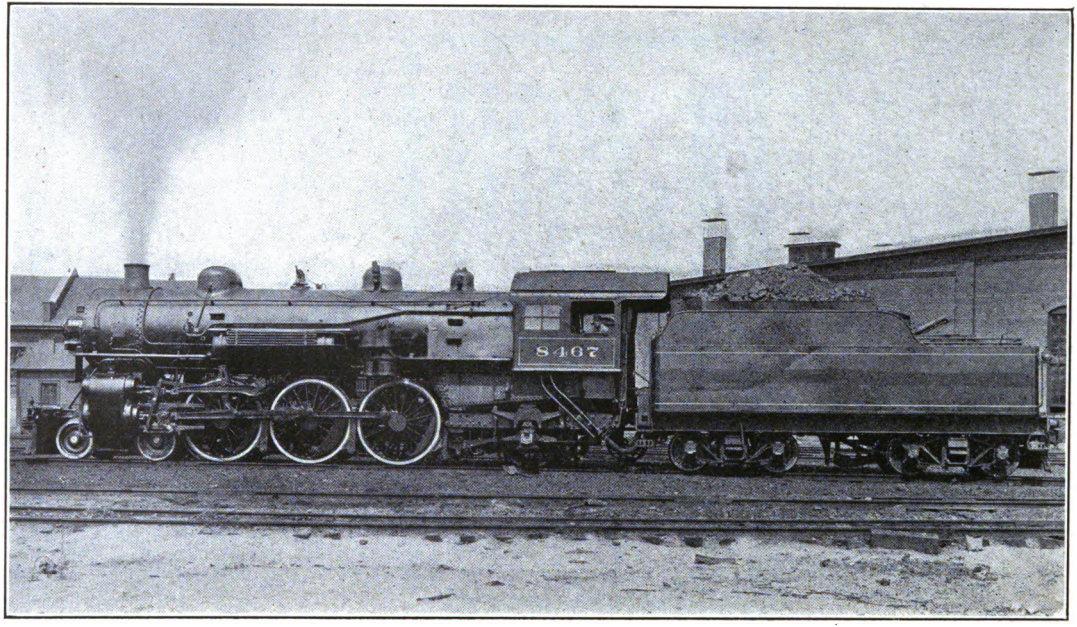

(*Frontispiece*)

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SAFETY FIRST

BY

GEORGE BRADSHAW

SAFETY ENGINEER, AUTHOR OF PREVENTION OF RAILROAD ACCIDENTS

FIRST EDITION

SECOND IMPRESSION

McGRAW-HILL BOOK COMPANY, INC.

239 WEST 39TH STREET, NEW YORK

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Our Purpose

FIRST AID TO THE UNINJURED

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INTRODUCTION

Officials and employés of railroad and industrial corporations are engaged in a most commendable and effective campaign for greater safety in operation. Never before has so much been said and written—*and done*—for the prevention of injuries. For years and years we have been talking about preventing accidents. We are now beginning in fact to prevent them.

This work, it is hoped, will contribute to the advancement of this campaign by calling the attention of the employé—the human machine—to views of unsafe and safe practices and conditions, with proper comment, in order that he may be better enabled to profit by the experience of others.

We trust that every employé to whose attention these views may come will study them carefully with an earnest desire to learn and apply something which will make him a safer man. Every view is "true to life" and we know, from actual experience, that every comment thereon is capable of practical application. The subjects of illustration relate to the performance of routine duties—matters of everyday occurrence. Don't think that as such, they are too commonplace to receive your consideration. An open switch, a broken rail, a bridge washed away, a mistake in receiving or reading a train order may cause serious accidents. But every one is on guard against these causes and they are less liable to exist because of the attention they attract. But the little improper conditions and practices make the accident record. They are serious, because they are "little things," so easily overlooked, for the same reason that fever germs are more to be dreaded than cannon balls.

GEORGE BRADSHAW.

HIGHLAND, N. Y.
July, 1913.

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UNIV. OF CALIFORNIA

FIG. 1.

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The equipment of most railroads has been provided with almost every conceivable mechanical device for the prevention of injuries. It is right that it should be. Yet last year one railroad employé was injured every four minutes and one was killed every two hours and forty-one minutes of the day and night from one end of the year to the other. Why? Because the Human Equipment has not been made as safe as the Mechanical. Because employés are continually taking chances and otherwise engaging in unsafe practices.

When the railroad employés of our country become as familiar with safety rules, regulations and practices as they are with those of the schedule and adhere to them as closely, then will we achieve "Safety First."

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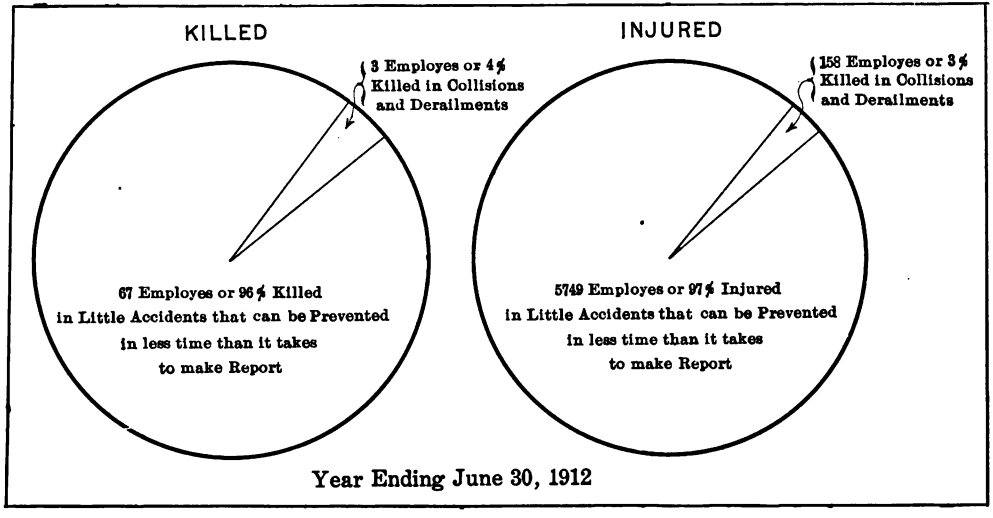
KILLED
3 Employes or 4% Killed in Collisions and Derailments
67 Employes or 96% Killed in Little Accidents that can be Prevented in less time than it takes to make Report
INJURED
158 Employes or 3% Killed in Collisions and Derailments
5749 Employes or 97% Injured in Little Accidents that can be Prevented in less time than it takes to make Report
Year Ending June 30, 1912

FIG. 2.

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Figure 2 showing the personal injury record on a large railway system is most interesting and instructive. It affords positive evidence of the fact that the most necessary requirement for greater safety is the correction of the little unsafe conditions and practices so frequently met with in the performance of regular duties.

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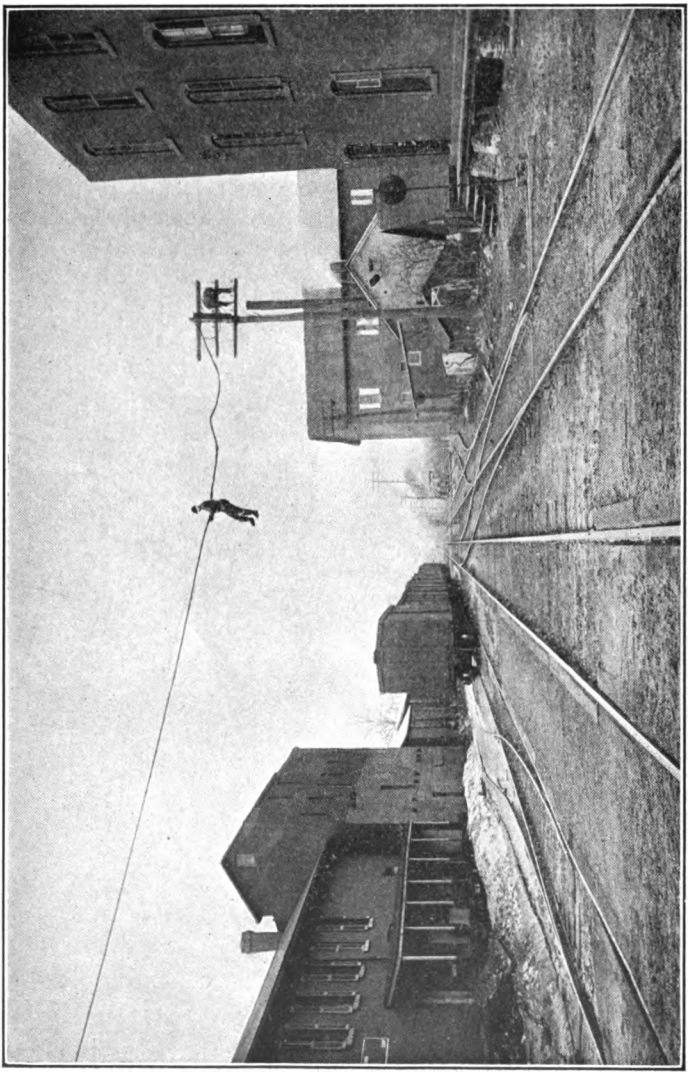

FIG. 3.

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Figure 3 shows a line man at work. Perhaps nine railroad men out of ten would say "that man's taking an awful chance; I wouldn't want his job." Yet this man is taking no greater chance, though it attracts more attention, than many railroad employés unnecessarily take every day. Think over some of the things you have done and see if this is not true.

In these pages you will find illustrated some of the things to be avoided.

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TO THE NEW MAN:

You are about to enter upon a most important service. If you are the right kind of man—and we believe you are—you naturally look forward to recognition and advancement in the service. Your success depends upon **Your Record.** Your record depends upon **You.** Don't forget that. We trust your service with this Company may extend over many years and that your Record may be **Without a Blot.** Especially do we hope you may be able to say, at the end of a long period of service, "I was never injured myself and no one was ever injured through my fault."

Don't you think you would be proud of such a record? To help you make this enviable record, we call your attention to some important Safety Precautions on the reverse side of this card. Read them over **Carefully.** Then read them again and again till you get them fixed in your mind.

FIG. 4.

Some good advice to the new man—and the "old man" can well afford to consider it. When your record is clear—before "something has happened"—is a mighty good time to think about Safety.

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CAUTIONS

The Safe Course is the Best.

Never kick a draw-bar to make a coupling. Better miss and try again.

Never go under your train or engine without being absolutely sure that your engineman knows where you are.

Never go between moving cars or a moving car and engine for **Any Purpose Whatever.** Stop them, if necessary, and wait till they do stop.

When necessary to go back flagging, remember that the lives of many persons are dependent upon you. You are paid "to go back" and there is no excuse for not going. Be sure you go far enough.

Never stand between the rails and attempt to get upon the foot-board of an engine as it comes toward you. Stand outside the rail or let the engine pass and get upon foot-board at the other end.

Never move cars at stations or sidings or other places where men are likely to be working in or about the cars without looking to see that no one is in a position to be injured by the movement and give such men proper warning.

Don't take chances. When a railroad man takes chances, the lives and limbs of himself and his fellow employés are the stakes. Every man who gambles loses sometimes—**but you can't afford to lose once.**

Remember that the rules of the Company were made because experience has shown every one of them to be necessary and they were made **To Be Obeyed.** You are paid to comply with rules—**all the rules** and not just those you think you ought to comply with. It is not for you to decide whether the rules are necessary or the best for the purpose. That question has already been determined by men of many years experience in the line of service you are about to enter. Think of that when you think of promotion.

FIG. 5.

If the trainmen of the United States would observe the above simply practical precautions, one out of eight of them would not be injured every year. Don't say you can't do so and "get the train over the road." We know you can, because it is being done—by some.

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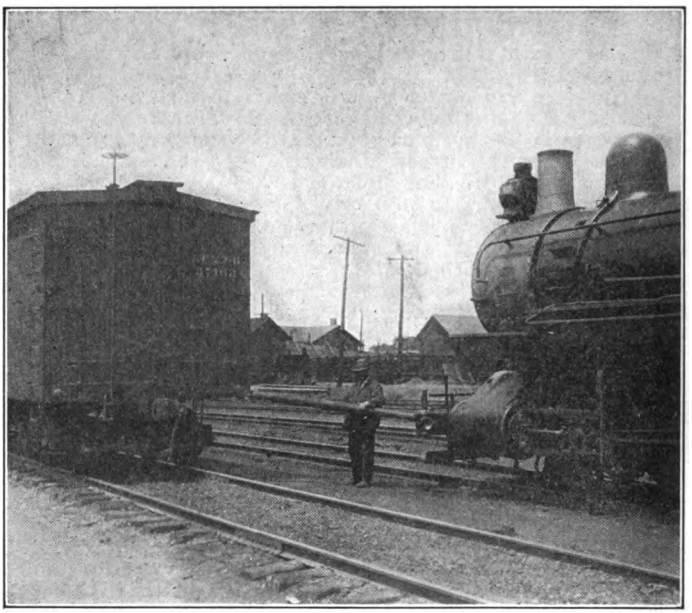

FIG. 6.

The wrong position to take while staking cars. If the push pole should break—which may happen even when the best quality of material is used—a man might be struck by one of the broken pieces.

Staking cars, at best, involves some hazard and the greatest care should be used in the operation.

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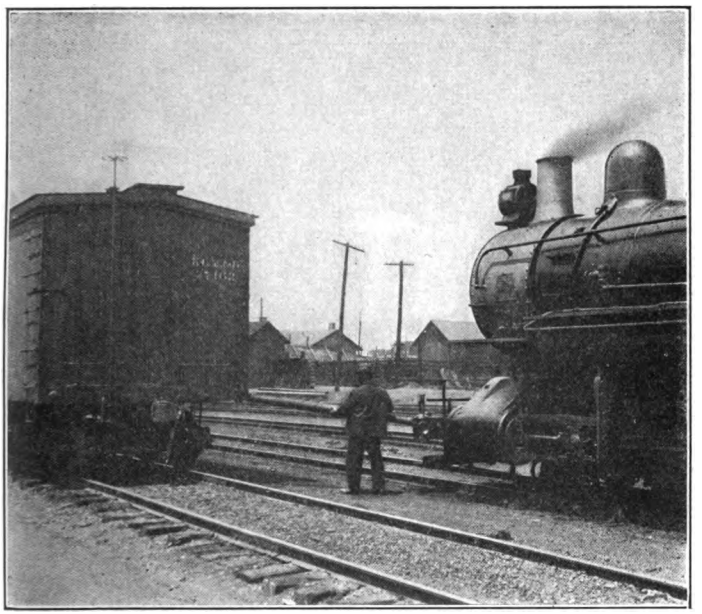

FIG. 7.

A safer method. If the pole should break, there is less likelihood of being struck by a broken piece.

Be sure that the proper kind and quality of push pole is supplied for your engine. Don't use fence post, cross tie or similar devices. On most roads there is a standard pole. Get it and use it.

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FIG. 8.

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In Fig. 8 is shown a condition responsible for many injuries. Patrons place coal, stone, sand, lumber and similar material so near the rail that trainmen, while walking beside track, stumble and fall over it. Material of this nature often slants toward the track so that in falling one naturally rolls toward the track and sometimes under the wheels.

These conditions, so common on industrial tracks, are due largely to the fact that patrons have not had their attention called to the serious results which may follow. If agents will call upon their patrons and explain, in a patient and diplomatic way, that serious injuries are often due to these conditions and request them in the interest of safety to keep their material back a safe distance from the near rail—about six feet—a very large percentage will comply with the request. This is not theory. The writer knows because he has done this in hundreds of instances and with most satisfactory results.

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FIG. 9.

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When engines or cars are overloaded with coal, the large lumps on top are almost sure to fall off in transit. They sometimes strike employés working on the right of way or patrons at stations. Fig. 9 shows a considerable quantity which has fallen off in a yard, due perhaps to shifting movements, at which place there is greater liability of injury by striking some one in falling and, if allowed to remain, it presents obstructions over which trainmen are liable to stumble and fall while attending to the movement of cars.

With the large type of tanks in common use, it is generally unnecessary to pile coal up very high and firemen should see that the load is trimmed down properly. Where coal heavers load the tanks, their attention should be called to the matter. If they don't heed the request of firemen to load the tanks properly, perhaps shoving the large lumps off on the ground at the chute where they will have to pick them up may serve to impress the matter.

In the case of cars, the fault ordinarily rests at the mines where the cars are loaded. The attention of mine superintendents should be called to the matter and proper loading insisted upon as a condition of accepting the cars for transit.

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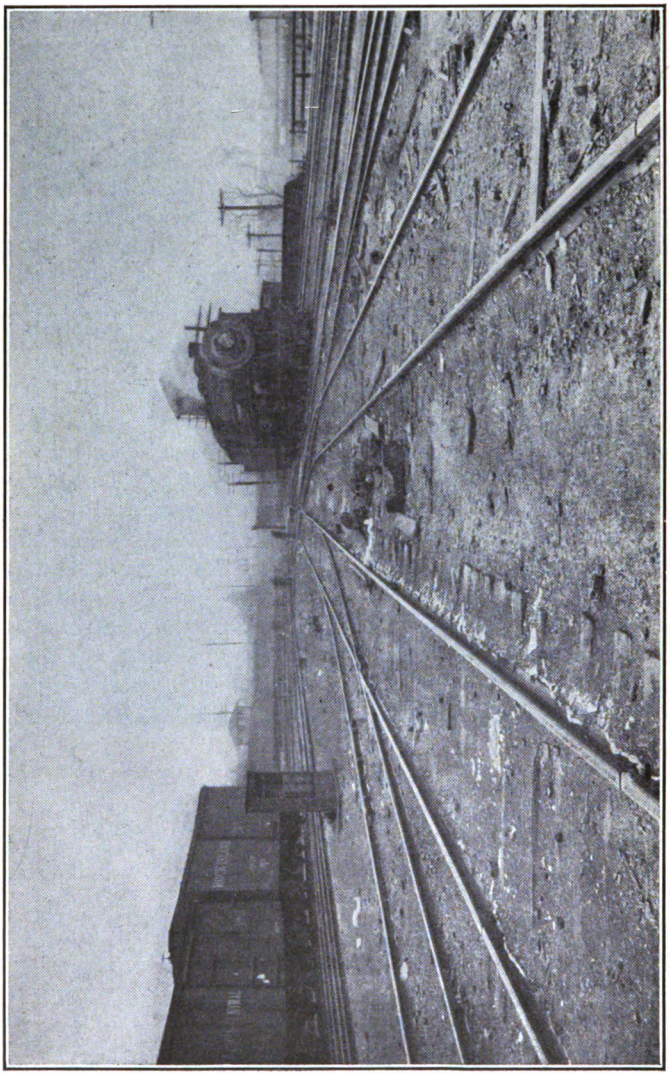

Fig. 10.

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Scrap material—drawbars, knuckles, springs, brake timbers —rapidly accumulate in any yard and if left between tracks constitute a condition which may at any time cause serious injury or death. Employés in shifting cars, giving and receiving signals, especially at night, cannot always look where they step. They must to a great extent assume that the way is safe—as it should be.

Car Department employés can do a great deal to promote safety by seeing that scrap material is kept cleaned up, but the fault does not rest entirely with such employés. Trainmen, in making emergency repairs, often throw draw-bars and similar materials between tracks. Of course, if such repairs are made in a large yard with long strings of cars on each side it may be impracticable to throw the scrap at a safe distance from all tracks. In such cases, the crew making the repairs should tell the yard-master, section foreman, some member of the safety committee or other proper person—there is always somebody around—that they were compelled to leave scrap material between certain tracks and ask them to have it promptly removed (Fig. 10). Think about the other fellow—or yourself for that matter because you might stumble over that same scrap on your next trip and get a leg cut off or get killed.

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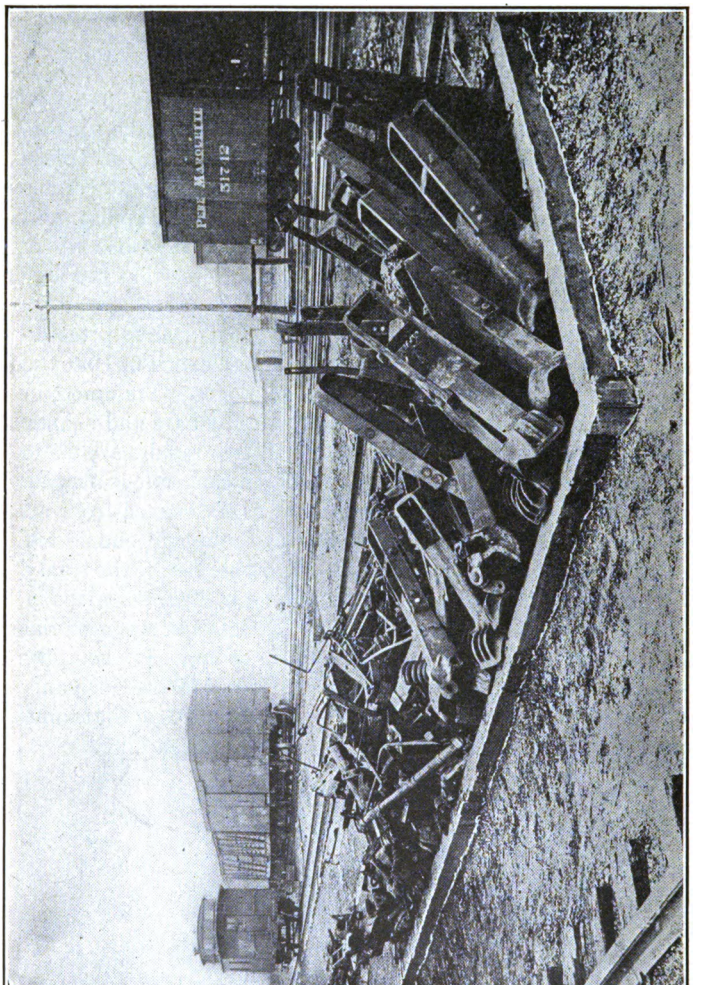

FIG. 11.

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A Scrap bin (Fig. 11)—Note it is well filled—located at convenient points in large yards. The very location of these bins serves as a reminder to pick up the scrap and put it in the bins and if the habit of doing so is once formed, it is not a difficult matter to keep a yard clean. A clean yard certainly looks much better and is much safer than one strewn with litter. The value of the scrap saved by giving close attention to this matter and the increased efficiency gained by operating in a yard where employés can move freely without "feeling their way" perhaps pays, as a business proposition, the expense of keeping the yard clean.

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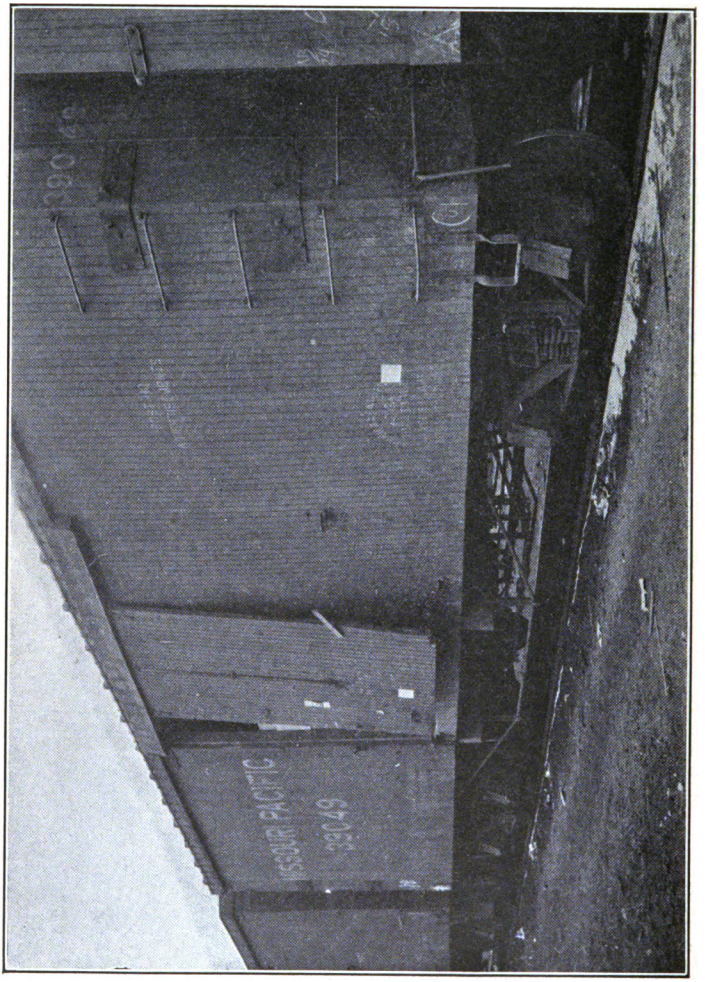

FIG. 12.

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Loose and "flapping" car doors, as shown in Fig. 12, are not infrequently the cause of injury to employés in yards and in double-track territory and sometimes have caused serious train accidents by scraping the sides of coaches on adjacent track. When such doors are noticed, they should be promptly nailed or otherwise secured in a safe position by the crew or other employés in charge and proper notice given for repairs when the car is set out. Don't think it a matter of too little consequence for report. It's the little things that cause the injuries.

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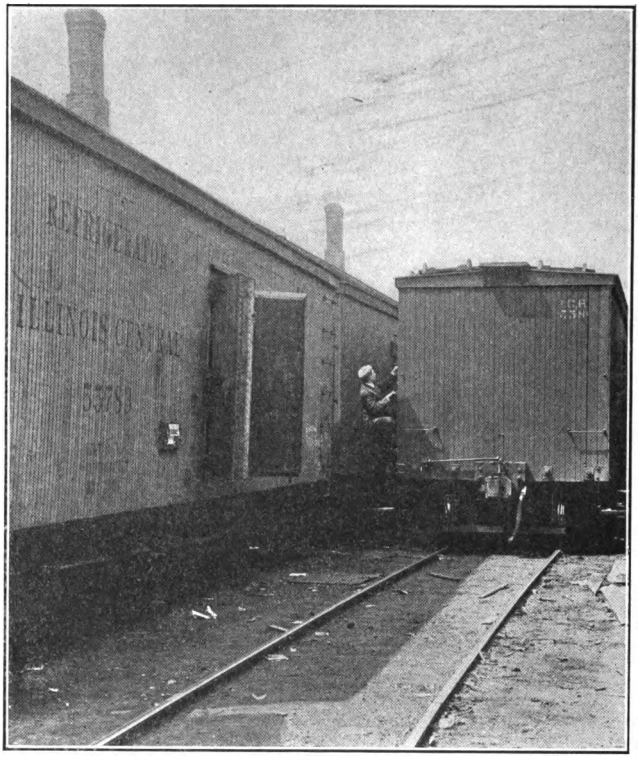

FIG. 13.

Leaving refrigerator doors open while cars are standing in the yards or when running in trains is a dangerous practice. Fig. 13 shows how a man on the side of a car on the adjoining track might be struck and injured. (Courtesy Ill. Central Magazine.)

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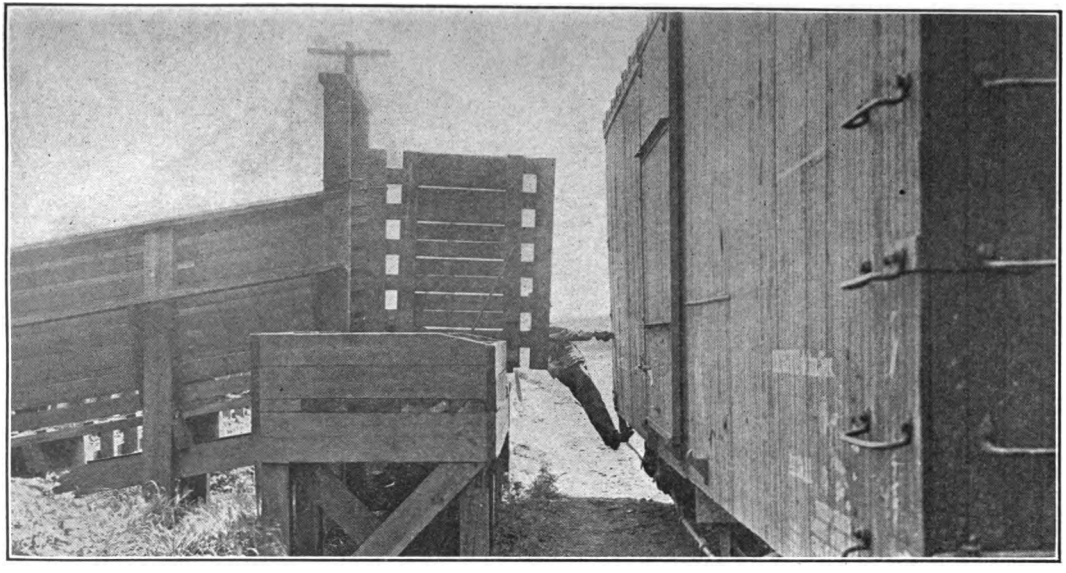

FIG. 14.—The above illustration shows the danger of permitting stock shute gates to stand open. Freight brakeman C. S. Webb of McComb lost his right leg and left foot in an accident like this. (Courtesy Ill. Central Magazine.)

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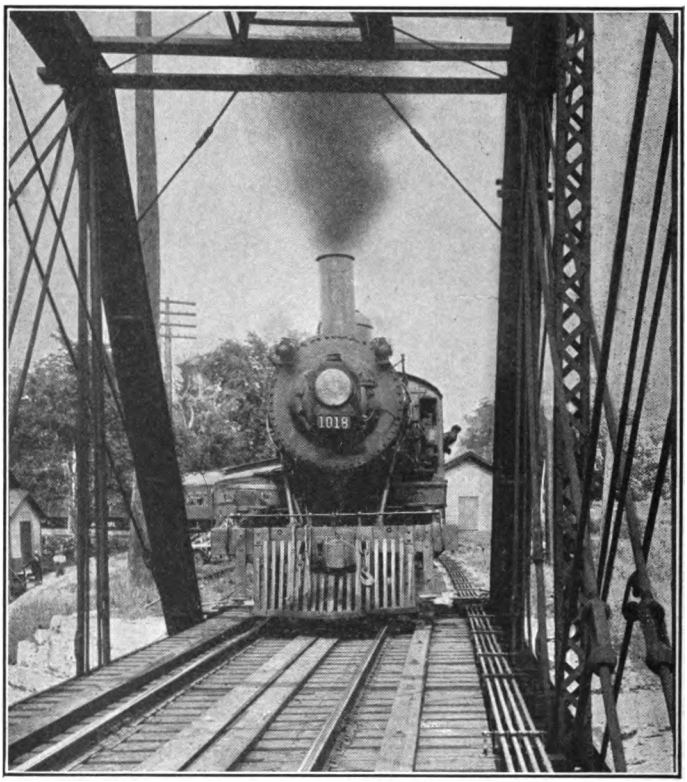

FIG. 15.

In Fig. 15 is illustrated the way serious accidents may occur; some very recent ones have happened in this manner. (*Courtesy Ill. Central Magazine.*)

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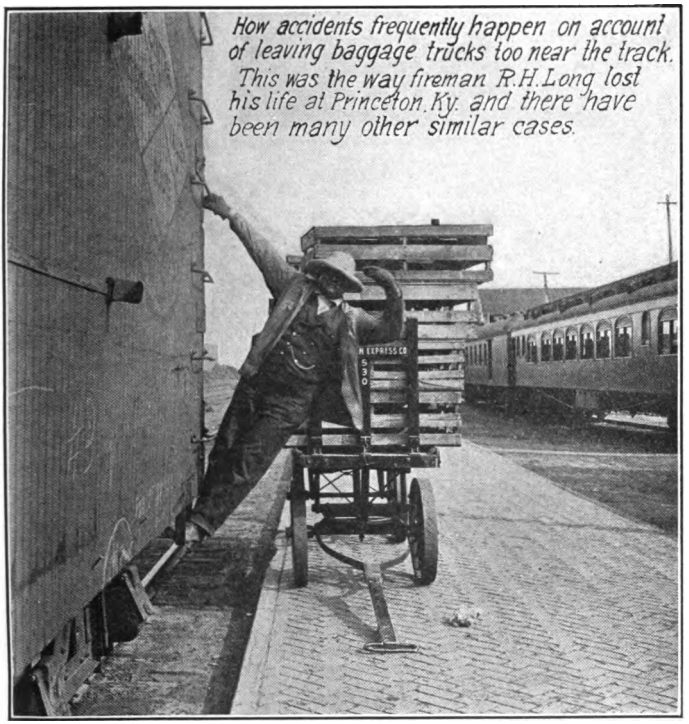
How accidents frequently happen on account of leaving baggage trucks too near the track. This was the way fireman R.H.Long lost his life at Princeton, Ky. and there have been many other similar cases.

(Courtesy Ill. Central Magazine.)

FIG. 16.

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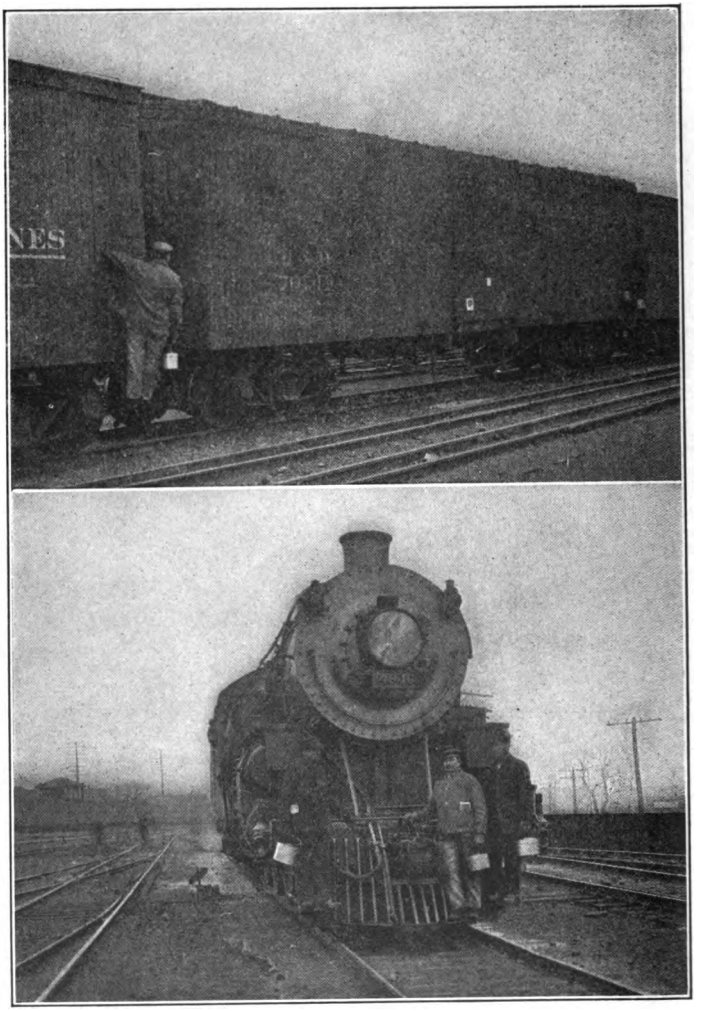

Figs. 17 and 18.

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Figures 17 and 18 show employés riding to or from their work on cars and pilot of engine. The greatest offenders in this respect are track, yard, shop and freight-house men—the very men who, not being accustomed by their duties to get on and off moving cars and engines, are for that very reason subjected to greater risk. They perhaps think that being employed by the Company justifies their riding on its engines and cars to and from their work. The fact is that they have no more right to do so than one not so employed.

Many men are injured and killed every year doing just what you see the men in these pictures doing. You have risks enough in the performance of your regular duties. *You are not paid to take the risks shown in these pictures. Can you afford to do so?*

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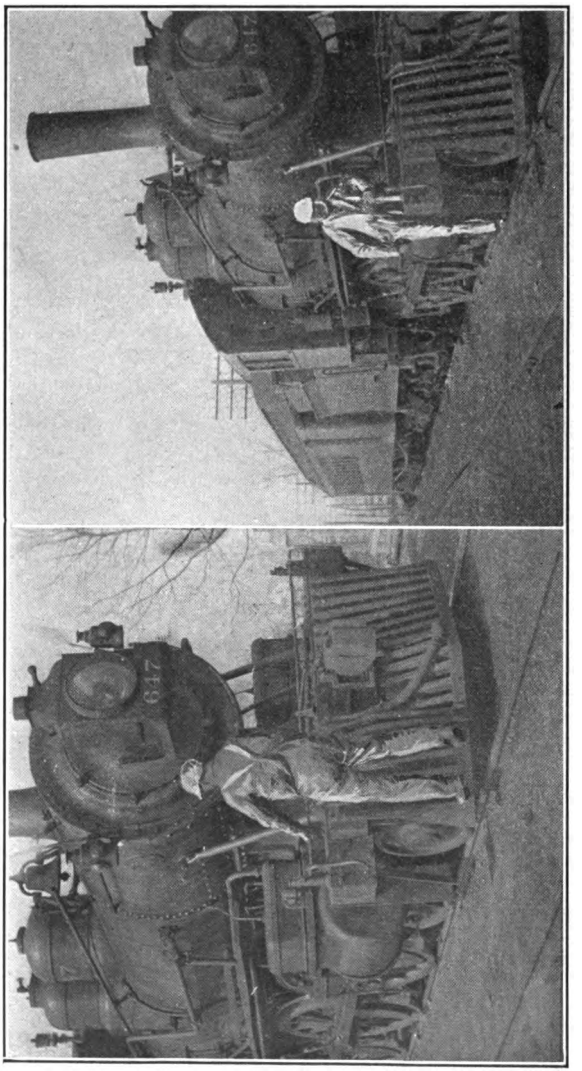

Fig. 20.

Fig. 19.

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Figures 19 and 20 are other views of hazardous positions on pilots of moving engines. Firemen, hostlers and roundhouse men often get upon the pilots of engines for short rides in connection with their duties. It is an unsafe practice and one responsible for many injuries.

A recent ruling of the Interstate Commerce Commission requires the pilots of all engines, used in interstate commerce, to be equipped with steps, but the presence of such steps should not be taken as indicating a proper place to ride. The purpose of the steps is chiefly to afford a means of reaching the headlight and upper part of boiler while the engine is standing.

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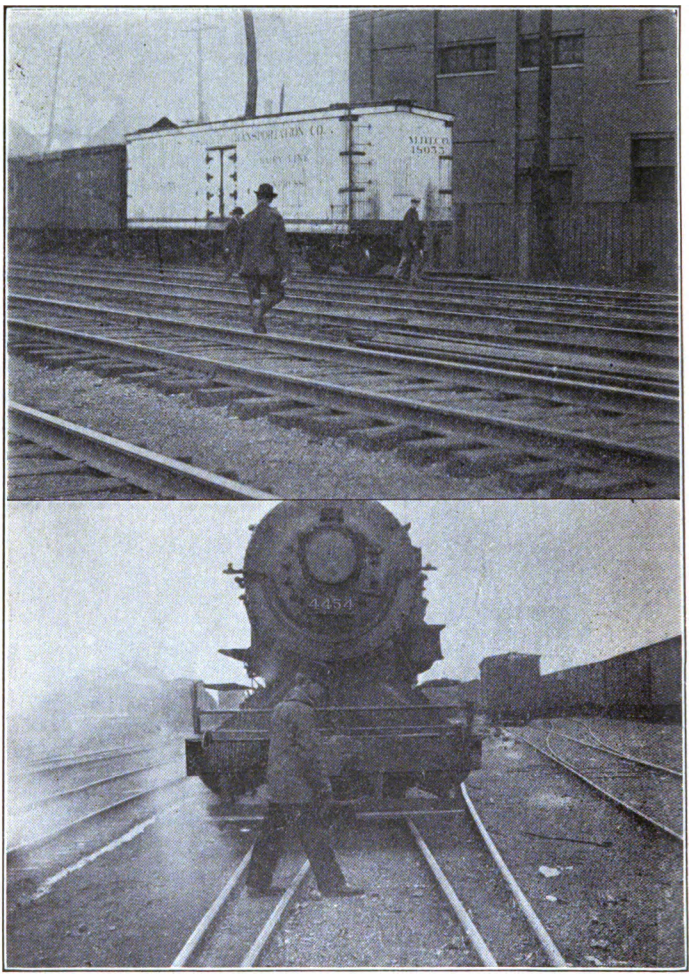

FIGS. 21 and 22.

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A large percentage of the injuries received by train and yardmen are due to their being struck by engines and cars. Figs. 21 and 22 explain how many of these occur. They are due indirectly to the fact that familiarity breeds contempt. One man is stepping upon the track very close to the end of a car and looking in the opposite direction. If the car should be moving he would almost surely be struck and run over. If standing still at the time a sudden movement would greatly endanger him. Another man is walking across the track immediately in front of a moving engine. Note he is looking down and not at the engine. He is a yard employé, but at the time seems to be thinking about something not connected with his work. This "absent mindedness," as it is ordinarily termed, is responsible for more injuries and deaths among railroad men than is generally supposed. Keep your mind on your work, or as it is commonly expressed, "keep your wits about you."

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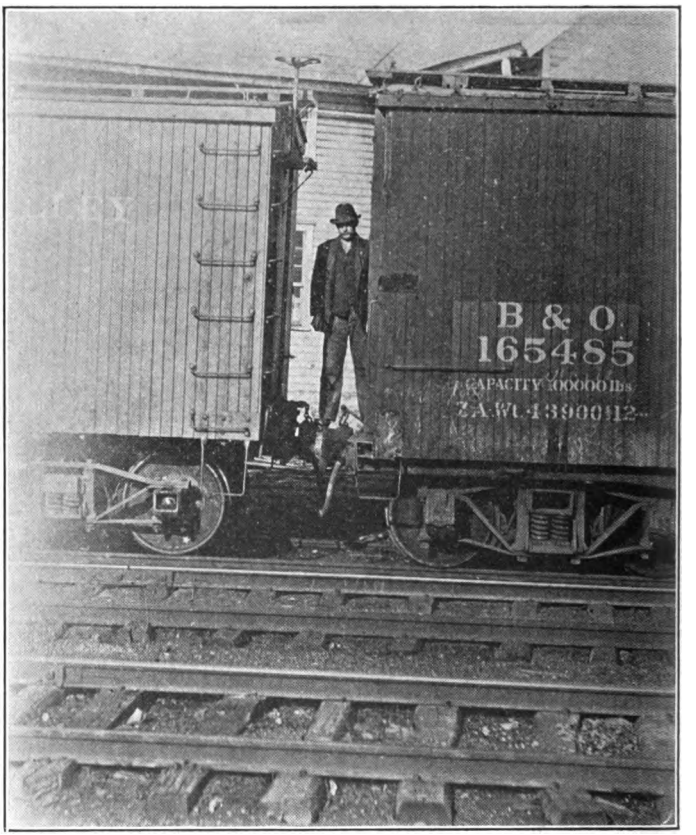

FIG. 23.

Crawling between cars instead of going around. It is not an unusual occurrence for employés to be injured in this way. Shop and track men are especially warned against this practice. Better take the time to go around or wait till the train moves out of the way.

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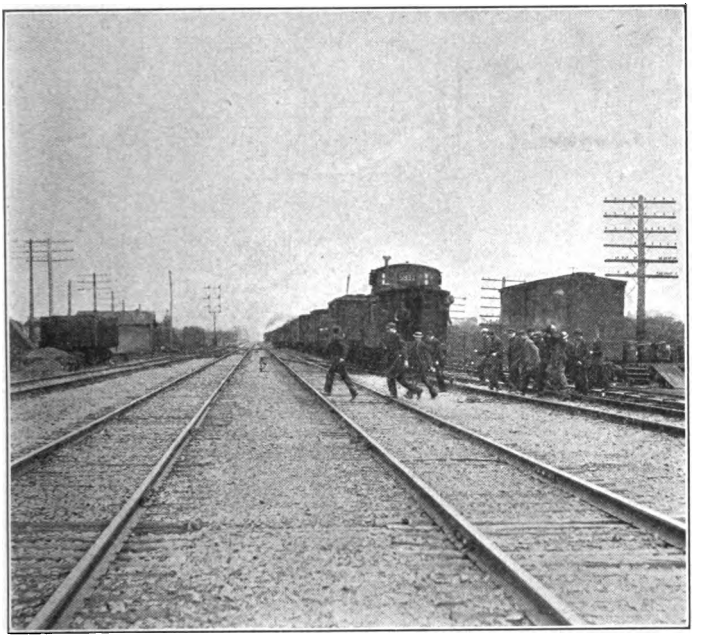

FIG. 24.

Taking the "near cut" across tracks to save a few steps going to a regular crossing. Freight-house and shop employés are the greatest offenders in this respect and large numbers of them are injured and killed every year doing what you see these men doing. Better take time to go to the place provided for crossing tracks.

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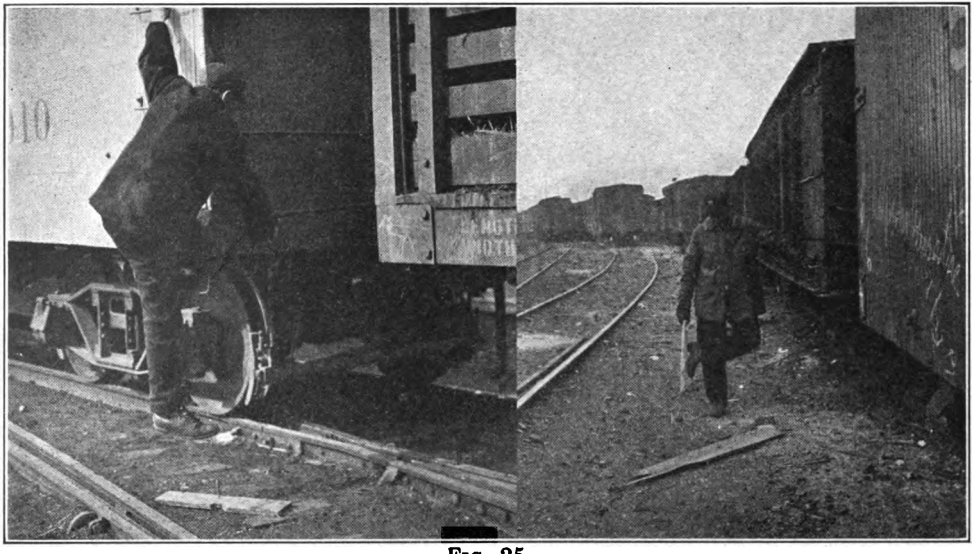

FIG. 25.

Showing how boards with the points of nails extending upward may cause injury when left in yards, walkways and other places where men have occasion to go. This cause of injury is in most cases due to thoughtlessness.

Remember this. It takes no more time or trouble to turn nails point downward than it

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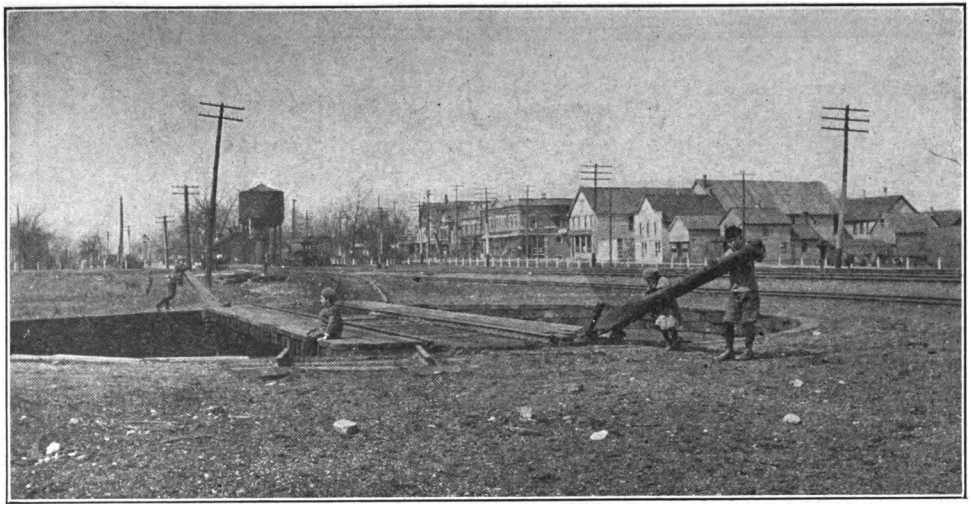

FIG. 26.

A movable turntable affords a great attraction for small children and many of them have been seriously injured while playing on and around same in the manner shown in Fig. 26.

Tables at out-lying points should be kept locked or otherwise secured when not in use.

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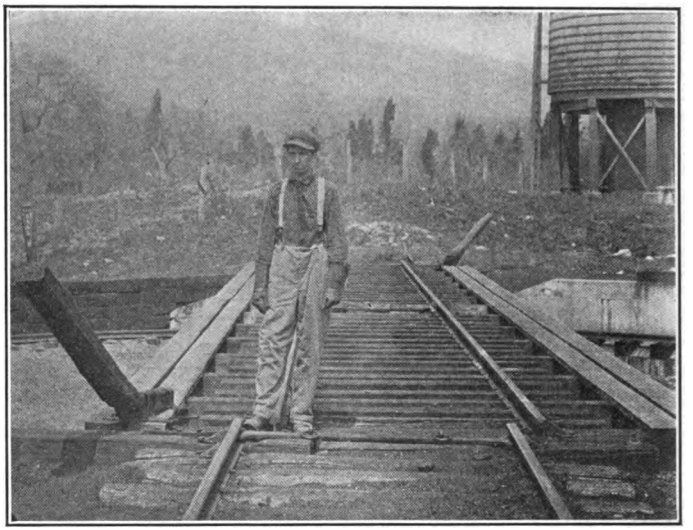

FIG. 27.

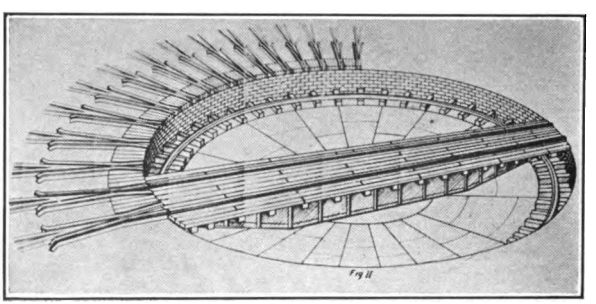

FIG. 28.

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Figure 27 shows how injuries are sometimes caused by getting the feet caught between the ends of rails at rim of turntable.

In Fig. 28 is shown a simple means of preventing this class of injuries. It consists in planking between the rails for a distance of about three feet back from rim of pit the top of planks being flush with top of rail and placed so as to allow a proper flange space. Where it is necessary to do trucking over the table, the planking can be ramped at both ends except for a distance of about six inches from the end of the rails next to the table which should not be ramped.

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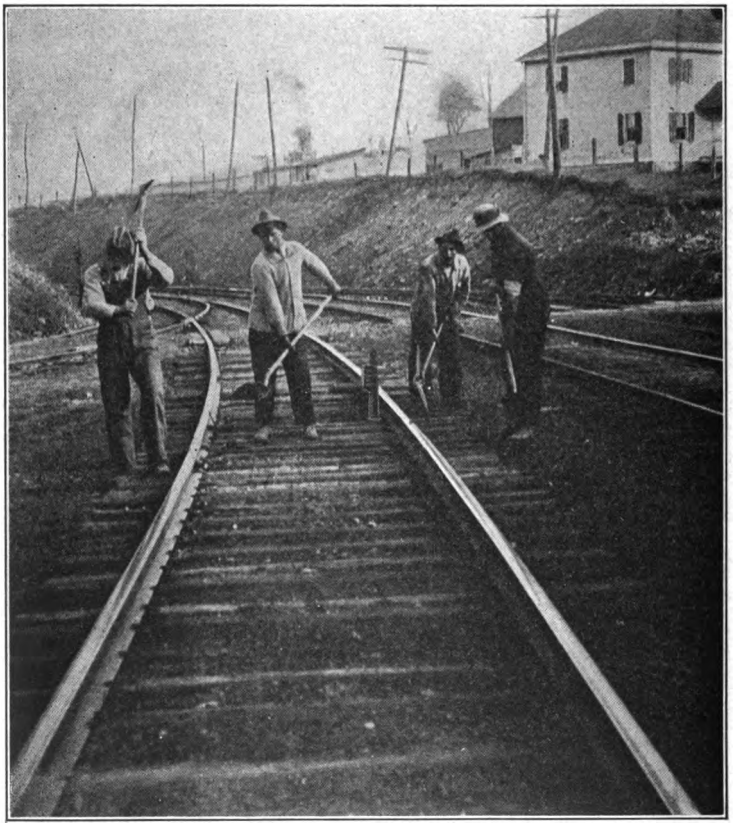

FIG. 29.

The unsafe method. Track jack placed inside of rail.

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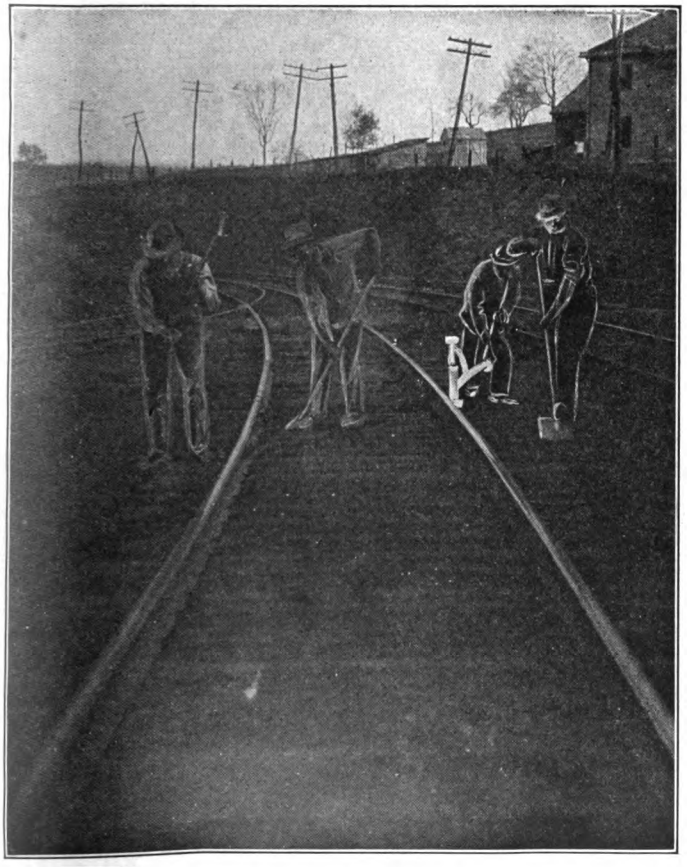

FIG. 30.

The safe method. Track jack placed outside rail.

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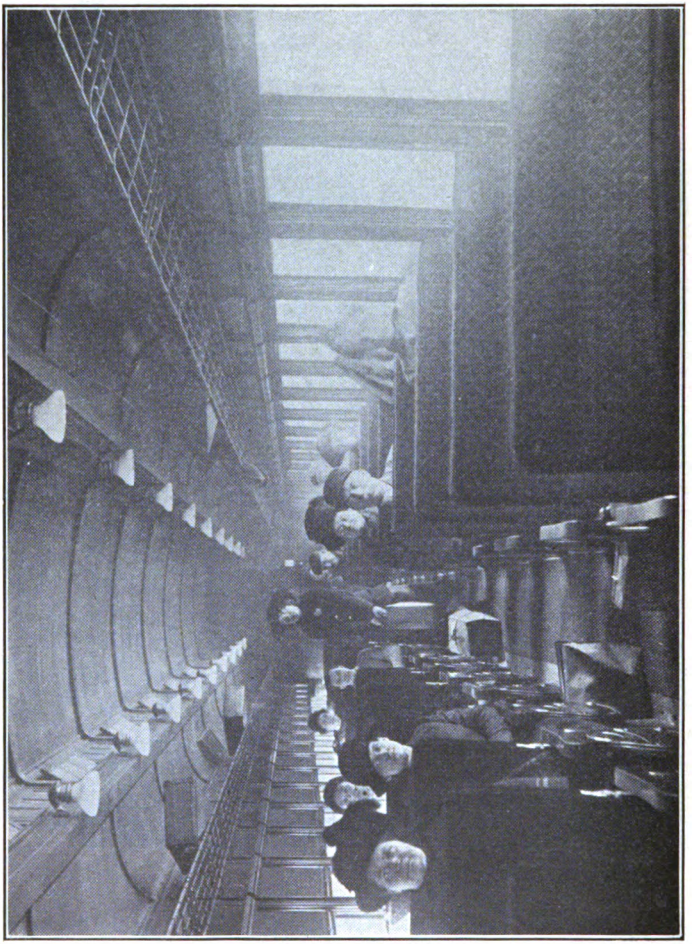

FIG. 31.

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Grips left in aisles, as shown in Fig. 31, in passenger coaches often cause passengers to stumble and fall. Trainmen should see that they are kept between the seats or in the racks. Care should be taken to place them in the racks properly and not to place in the racks articles which, because of weight or bulk, are liable to fall.

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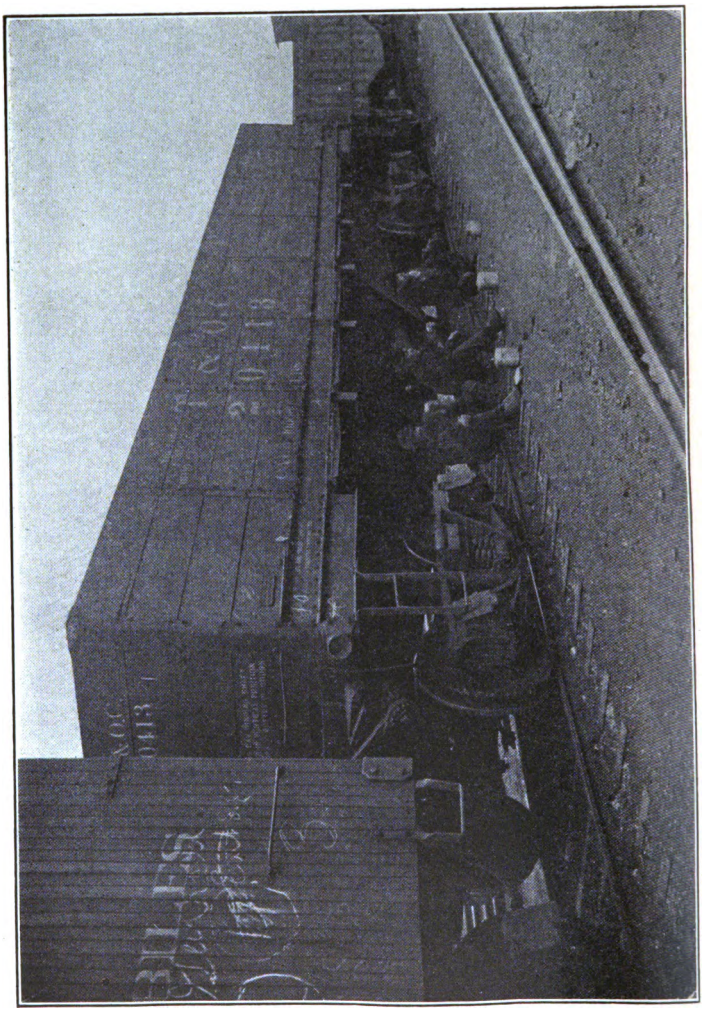

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If the men shown in Fig. 32 had believed in "Safety First" instead of eating first, they would have sought a different place for lunch. Don't think this picture is overdrawn. Personal injury reports prove that it is not.

No insurance company would take a risk of this kind except upon payment of a high rate of premium, yet these men, with families dependent upon them, take the risk for nothing. Is it good business policy?

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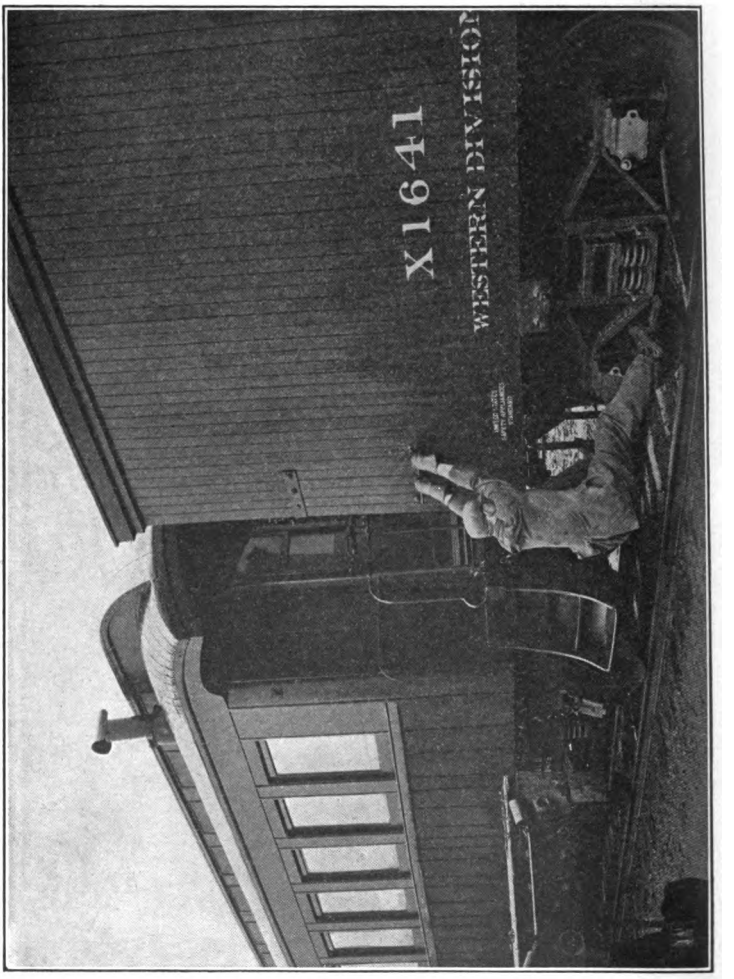

FIG. 33.

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Figure 33 illustrates an unsafe way to ride upon the side of a car. Note one foot, instead of being in the stirrup, is in truck frame where it might slip and get under wheel. The body is projecting from the car in such position that it may strike a low switchstand.

The proper way is to place both feet in stirrup and bring the body in an upright position as close to the car as practicable.

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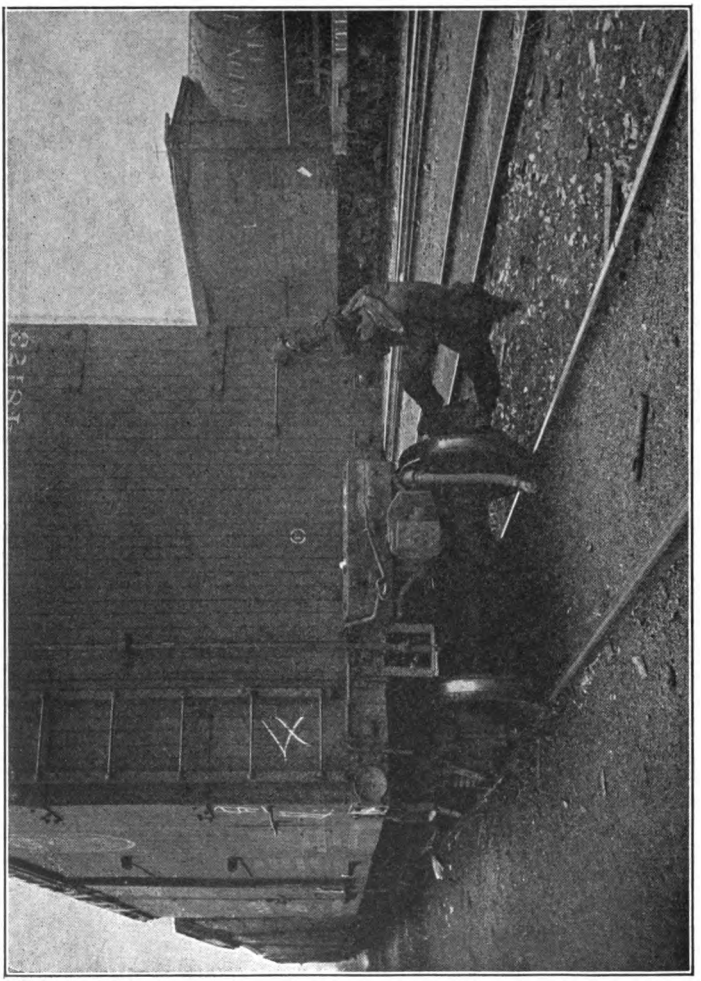

FIG. 34.

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Figure 34 shows another unsafe way to ride a car. The car is supposed to be moving toward the man so that if his feet were to slip from the journal box, he would probably be run over. The position is not only unsafe for himself, but involves additional risk in operation, because, owing to his position, he can neither give nor receive signals.

Cars and engines are equipped with almost every conceivable safety device, but they are of little value to the employé who is careless in his methods.

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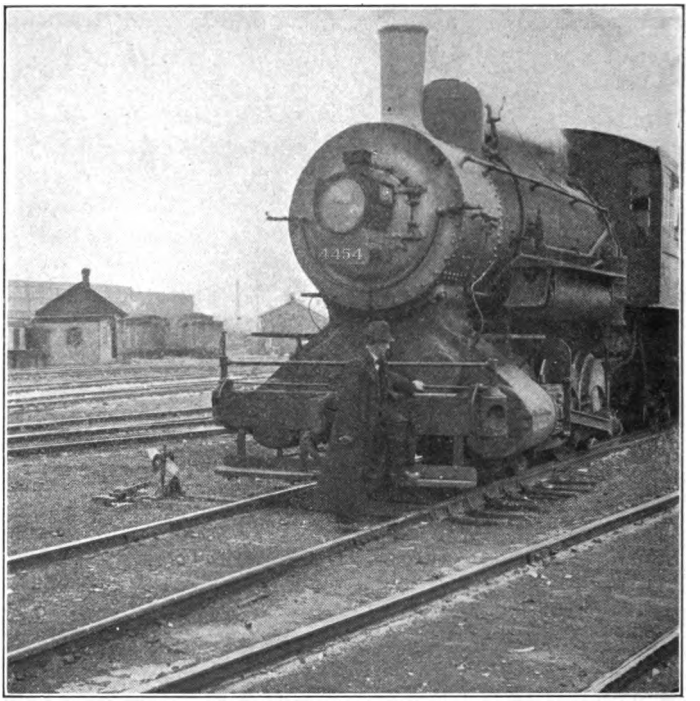

FIG. 35.

Standing between rails and getting upon foot-board as engine approaches. One of the most unnecessary and reckless practices in which a trainman can engage and one responsible for many injuries and deaths. Don't do it.

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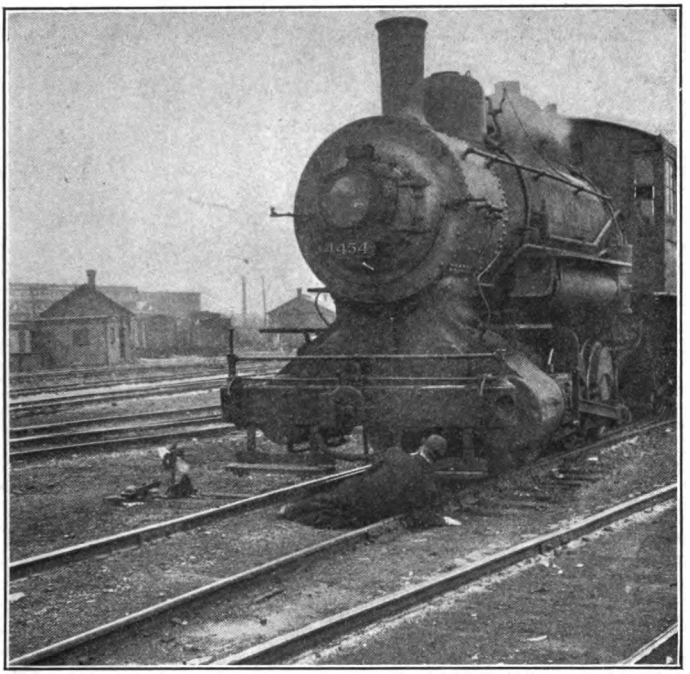

FIG. 36.

This is what happens to the man shown in the previous picture when he misses his step or loses his hold or rather it shows what is going to happen to him when the engine advances a few feet.

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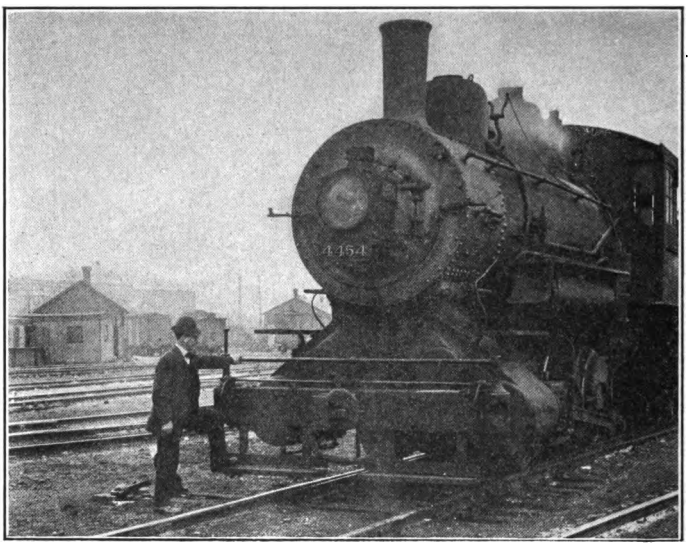

FIG. 37.

A safer way to get upon the foot-board of an engine as it approaches. Standing outside the rail where, if he should fail to catch the grab iron, or should lose his hold and fall, he would in all probability fall outside the rail. Of course, the safest practice is not to get upon the foot-board as the engine approaches, but it is hardly practicable or desirable to stop the engine in order to get on the foot-board and where employes are duly careful, with the safety appliances provided there is no great risk. In the case of light engines, however, one can often just as well ride upon one end as the other and in such cases, the engine should be allowed to pass and then get upon the foot-board as the engine moves away from you.

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FIG. 38.

The only comment to make on the way this man is getting on the foot-board (as engine approaches) is that he is on the fireman's side. Wherever practicable, it is safer to get on foot-board on engineman's side, because the engineman is supposed to be on the lookout at all times and can stop if anything goes wrong. The fireman is always "putting in a fire" when anything happens.

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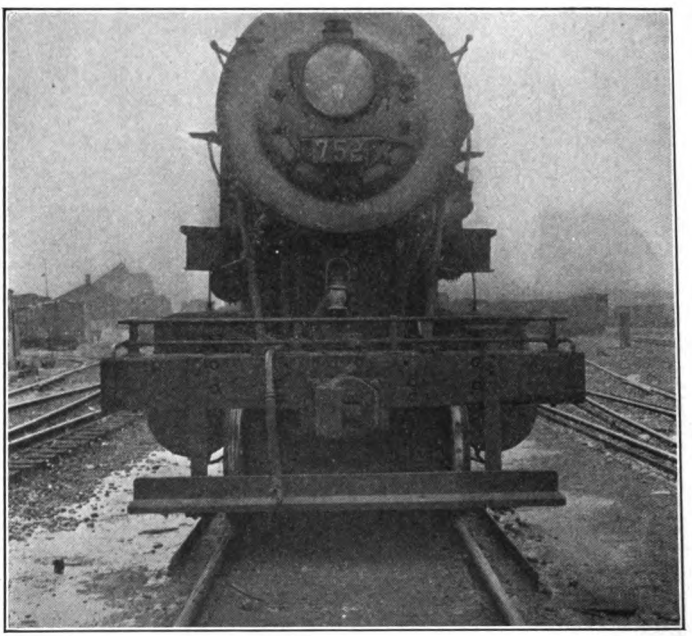

FIG. 39.

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Note the engine shown in Fig. 39 has continuous foot-boards while the others have the foot-board in two sections which is the standard for those applied in the future. Serious injuries and deaths have resulted from employés attempting to go from one side of the drawhead to the other along continuous foot-boards while engines were moving. This practice should be avoided especially in the case of foot-boards cut out under the drawhead as shown in the cut of engine 140.

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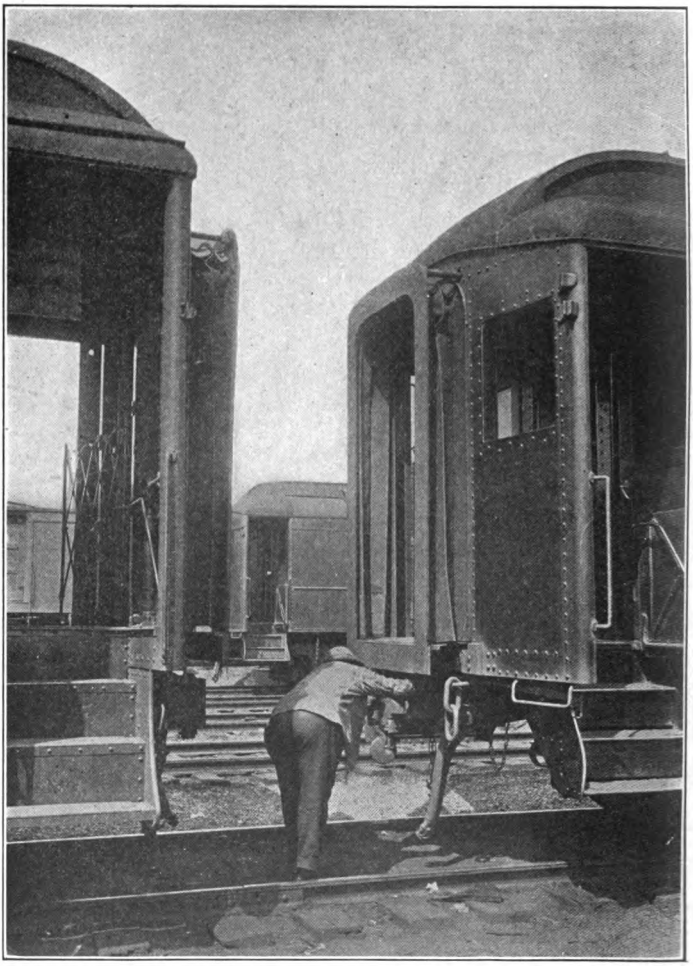

FIG. 40.

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Many trainmen are injured every year while making light emergency repairs to cars, especially drawbar repairs. Fig. 40 shows a man between cars which are separated such short distance that a very slight movement might result in his being caught. There is always the possibility, and in large yards, the probability, of a car or engine being shunted against the string and moving the cars suddenly. One's mind being intent on the work makes the danger all the greater. Ordinarily such repairs take but a few minutes and for that reason some employés are inclined to think special precautions unnecessary.

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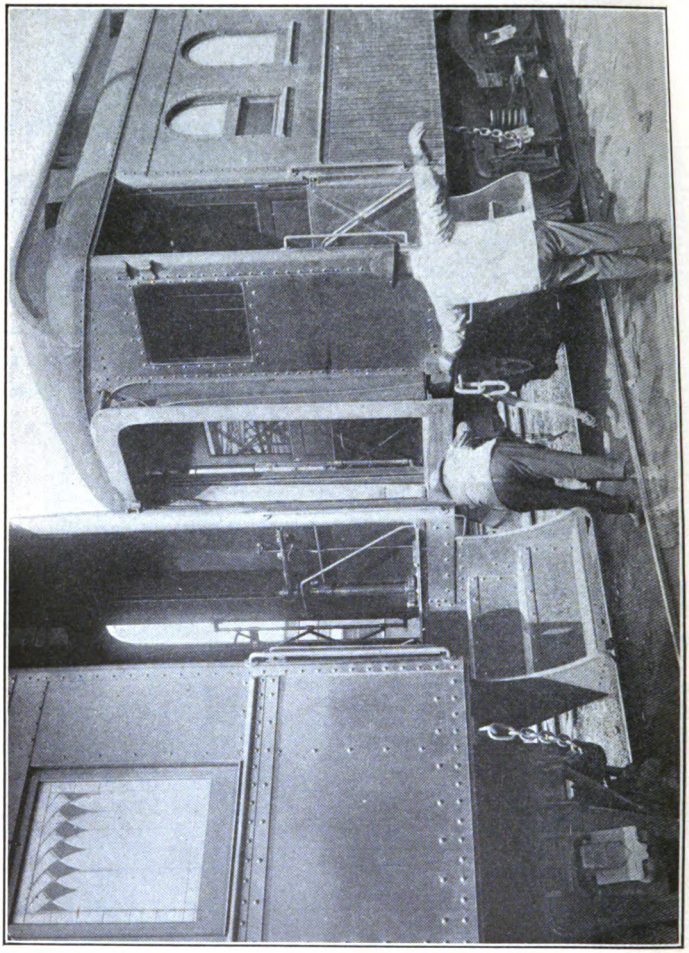

FIG. 41.

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Trainmen in making light repairs sometimes go between cars without letting other members of crew know they are going to do so. Fig. 41 shows how easily a serious injury may be due to such neglect owing to one of the crew, not knowing of the other's position, giving a signal for movement of cars.

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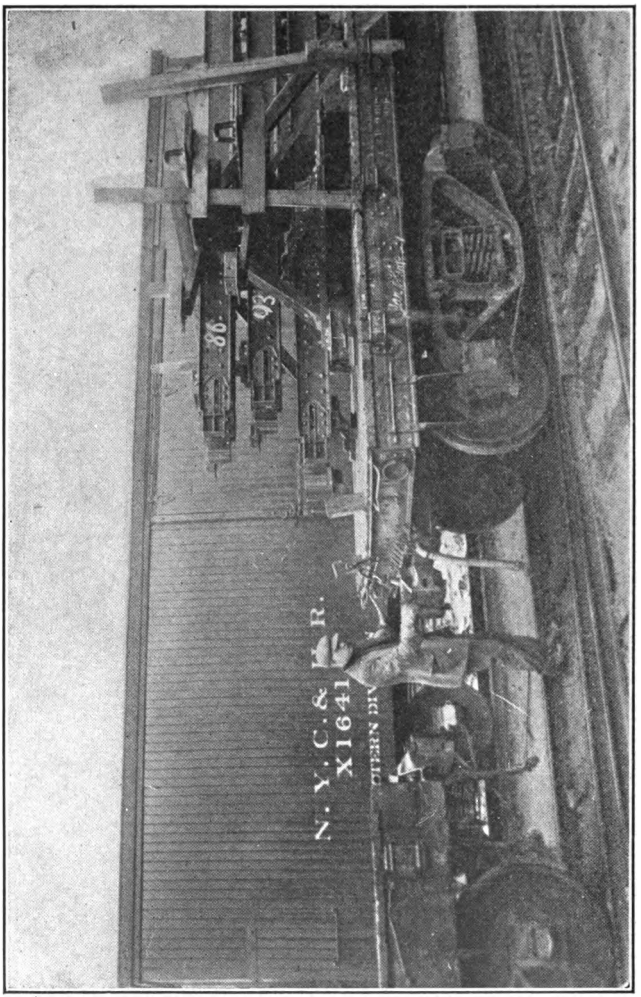

FIG. 42.

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Opening the knuckle on car as the coupling is about to make. In Fig. 42 note the man is standing between the rails which is an unnecessary risk. The car on which he is opening the knuckle is supposed to be moving and note it is very close to the other car. The safer method is to stand outside the rail and open the knuckle when there is a safe space—at least one-half car length—between the two cars. It is best, where practicable, to open the knuckle on the standing, instead of the moving, car.

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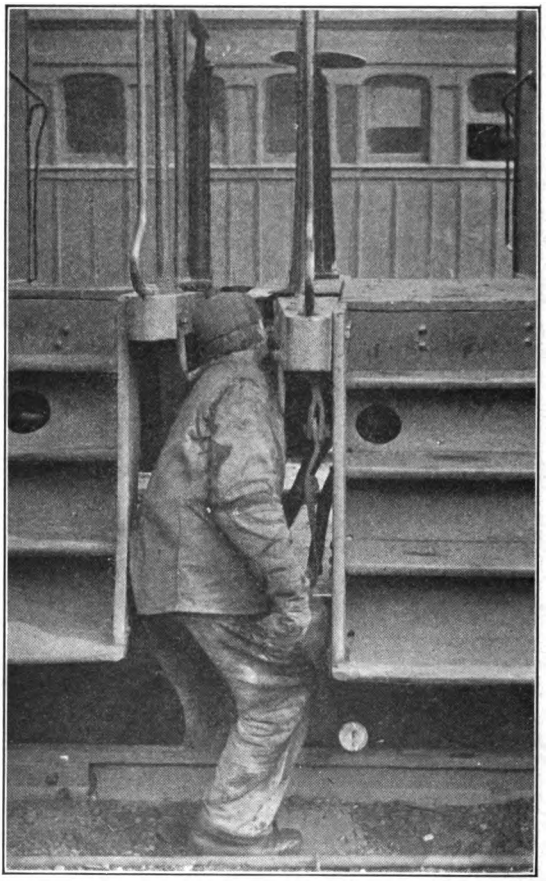

FIG. 43.

The unsafe method. Head between end-beams.

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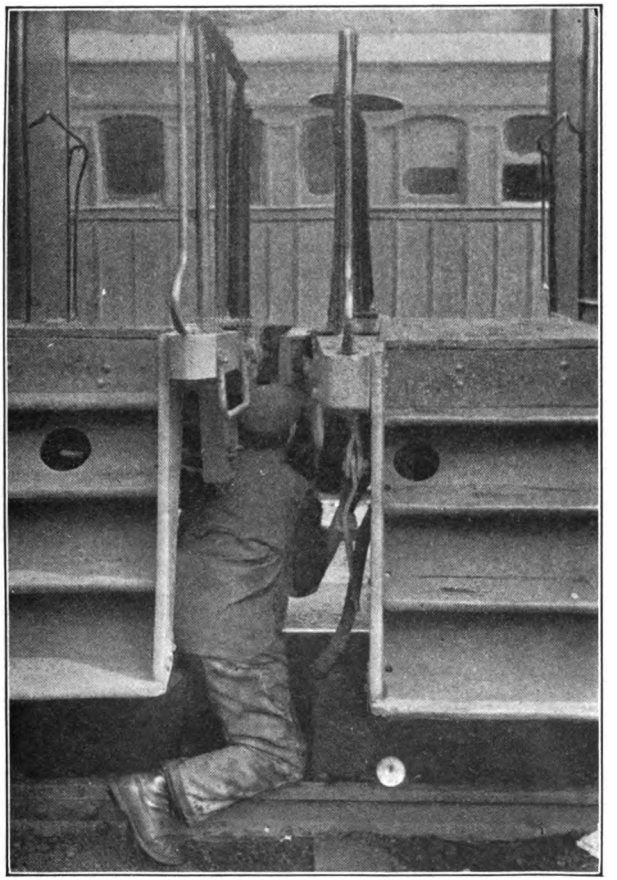

FIG. 44.

The safer method. Head clear and below end-beams.

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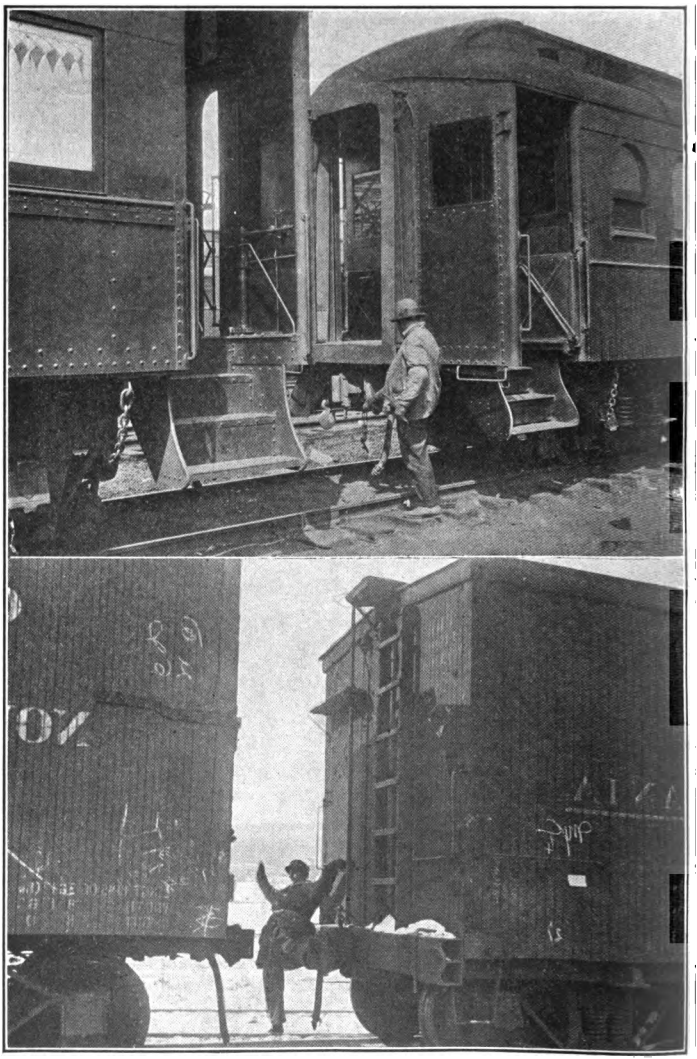

FIGS. 45 and 46.

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Adjusting (kicking) drawbars to make coupling. Figs. 45 and 46. This is an old offense and yet one which is still claiming its victims almost every day. The excuse usually given is that it saves time, but the men you work for don't want time saved by taking this risk. Besides the time really saved is not worth considering. You don't really do this for the sake of saving time so much as through the force of habit.

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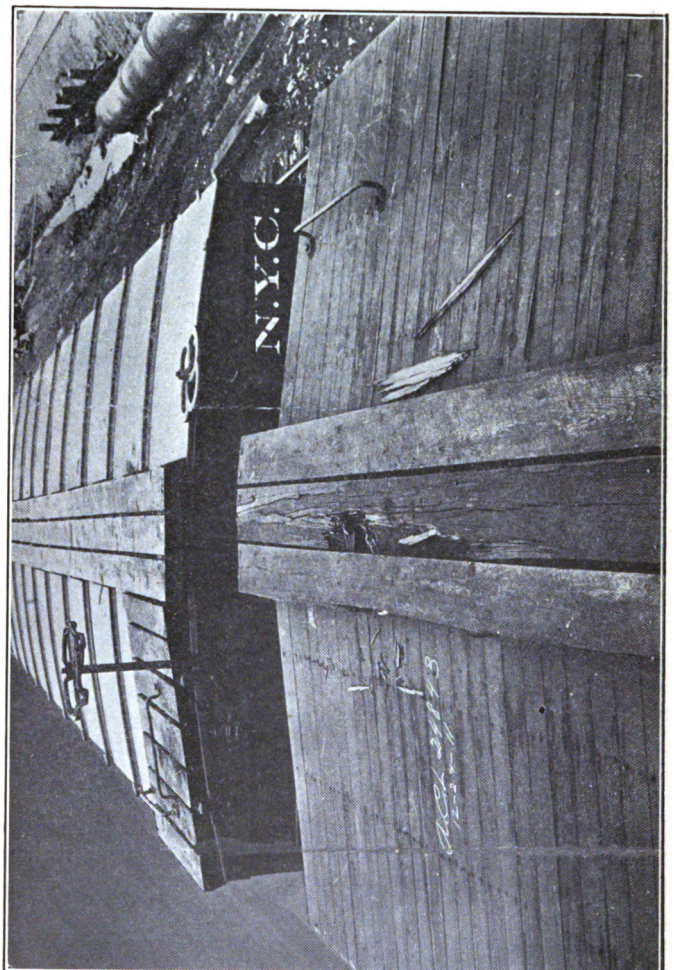

FIG. 47.

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In Fig. 47 is shown a hole in running board which caused an employé to lose his balance and fall from car resulting in serious injury. Investigation showed that the car had been in the yard where the injury occurred some two or three days during which time other brakemen had been over it and presumably saw the defective condition, but no one's attention was called to the matter.

When you see conditions of this kind, report them at once. Of course, it was the duty of the car inspector to discover this defect and have it repaired, but remember that no one has more than two eyes or can be in more than one place at once. Help the other fellow. It makes it safer for everybody.

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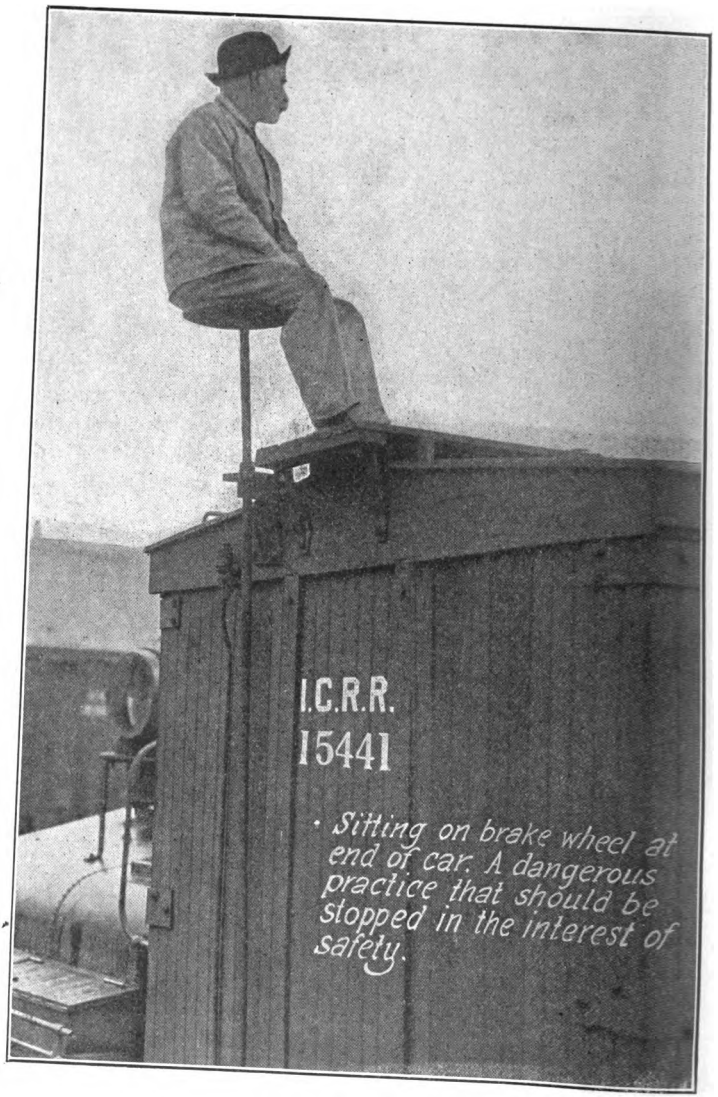

(Courtesy Ill. Central Magazine.)

FIG. 48.

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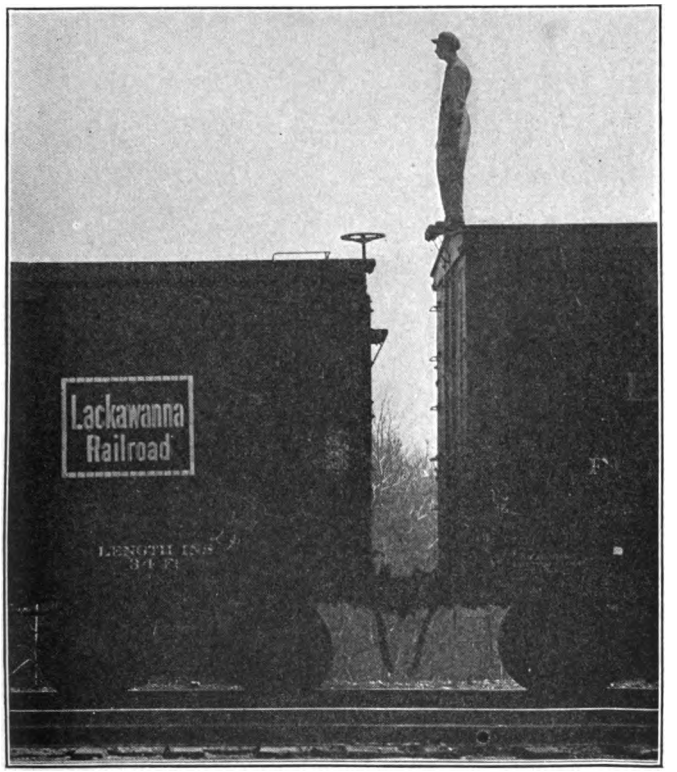

FIG. 49.

Do not stand right at the end of a moving car. It is safer to stay back a few feet.

Unless really necessary, do not ride on top or side of very large cars on account of the greater risk of striking overhead or side obstructions.

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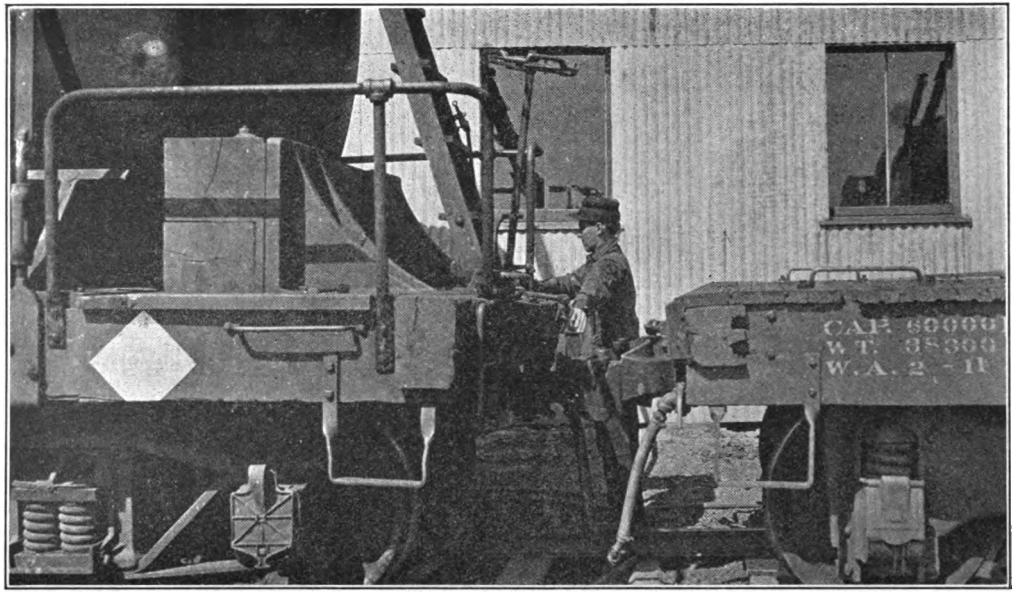

FIG. 50.

Between moving cars "to pull the pin." Better take time to stop the cars or go over to the other side.

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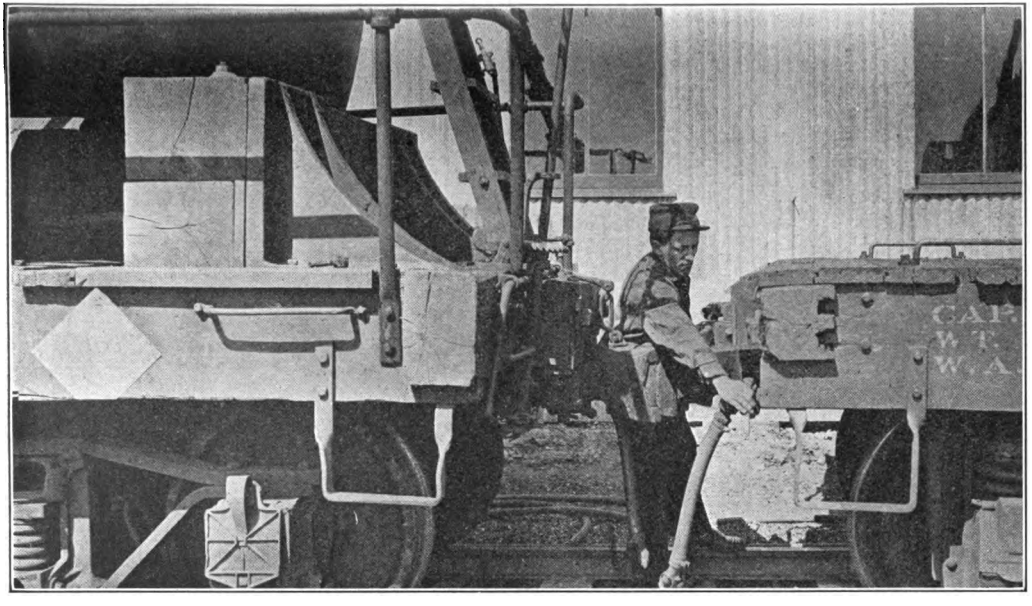

FIG. 51.

Between moving cars reaching over drawbar to turn angle cock—a position of special hazard which should always be avoided.

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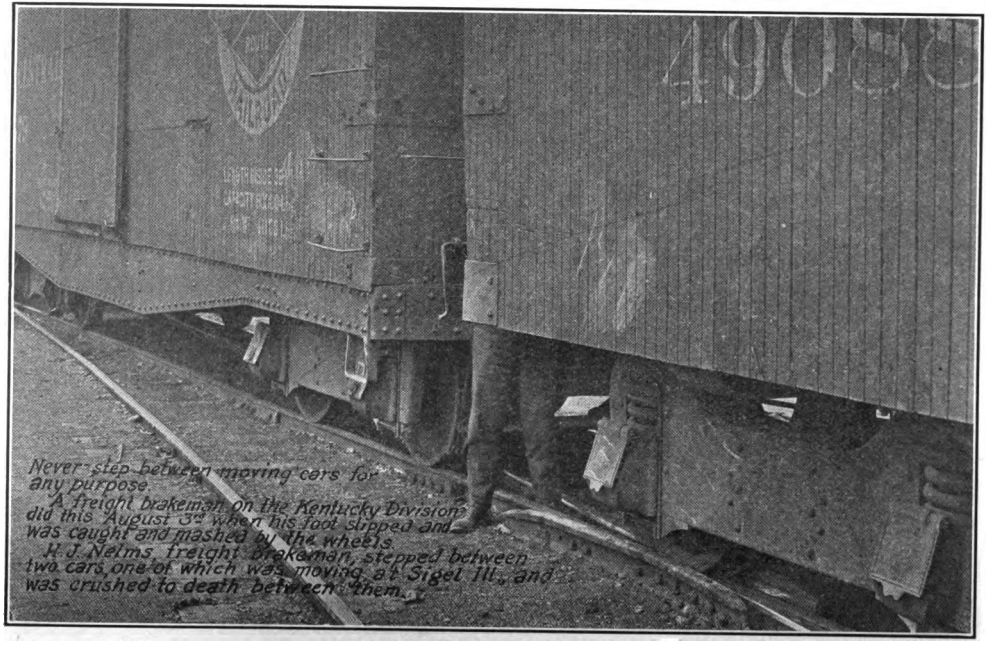
Never step between moving cars for any purpose.
A freight brakeman on the Kentucky Division did this August 3d when his foot slipped and was caught and mashed by the wheels.
H. J. Nelms, freight brakeman, stepped between two cars, one of which was moving, at Sigel Ill., and was crushed to death between them.

(*Courtesy Ill. Central Magazine.*)

FIG. 52.

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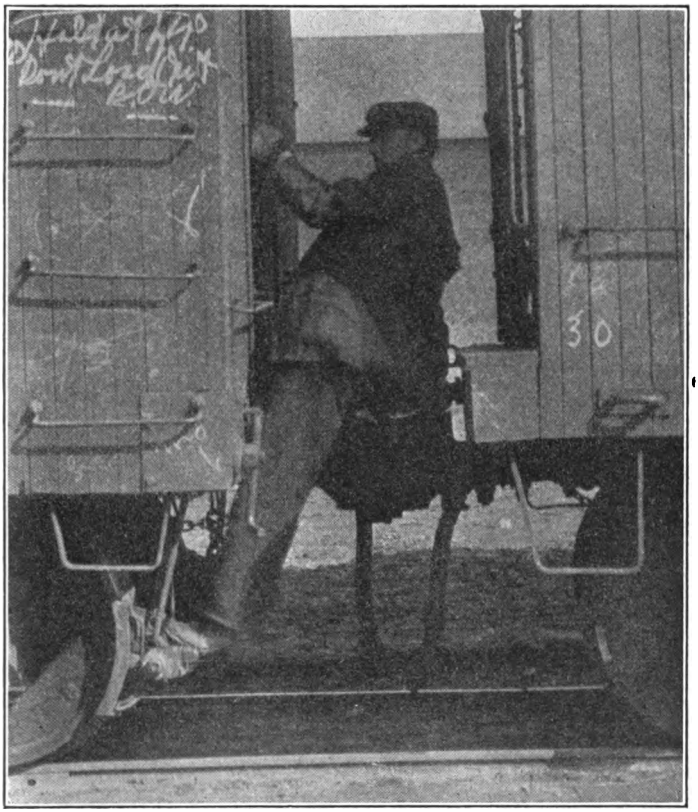

FIG. 53.

Riding between moving cars with feet on brake beam. This is a practice involving great risk and should be avoided.

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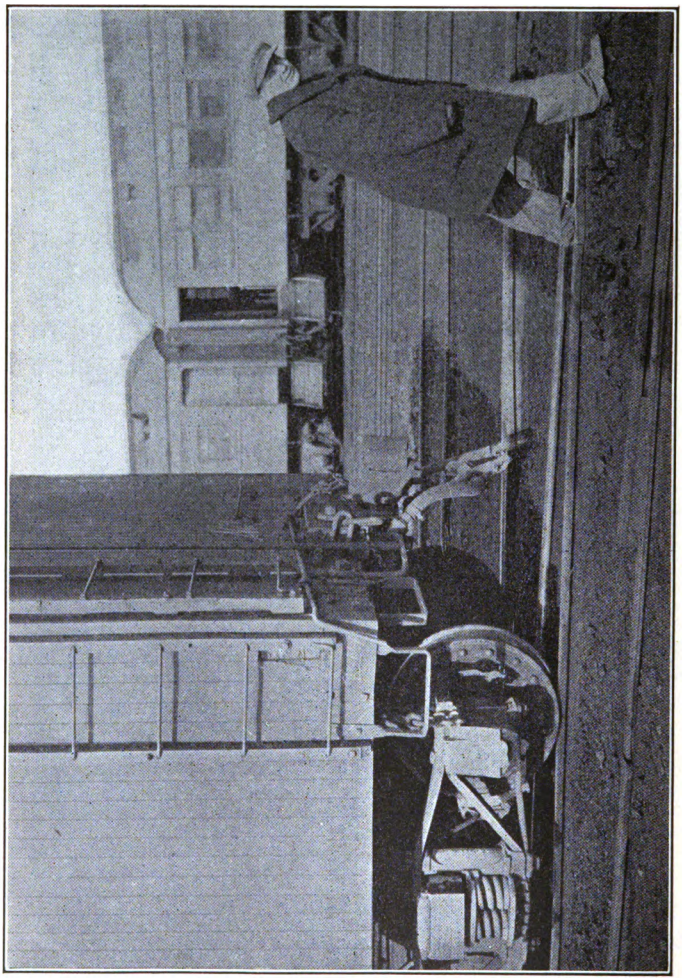

FIG. 54.

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Don't walk between the rails immediately in front of moving cars as shown in Fig. 54. There is always the possibility of getting a foot caught in a frog, switch or guard rail or in the flange space at highways or of stumbling and falling. Serious injuries from such causes have not been infrequent. Such position also places one where he cannot see, or be seen by, the engineman and is, therefore, hazardous for another reason.

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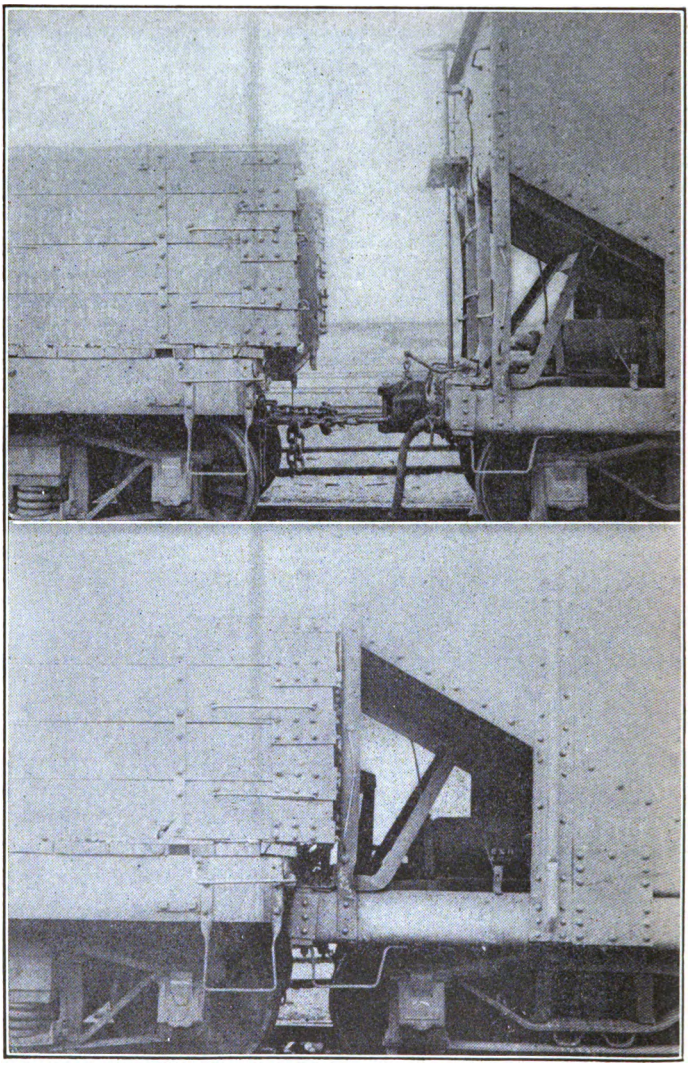

FIGS. 55 and 56.

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Figures 55 and 56 show Bad Order cars chained together. A B. O. car, tool or appliance is a danger sign and should serve as a warning to every employé to exercise the utmost care in working about or with it. While, as already explained, it is unsafe to go between any kind of moving cars, it is especially unsafe in the case of cars with B. O. or missing drawbars. Use the greatest possible care in chaining such cars together, informing the engineman and all other members of the crew of what you propose to do. Keep your body and head below the end sills as the slack is liable to run out and catch you. That is just what did happen while a brakeman was chaining up the cars shown in these pictures and he was caught and killed when they came together.

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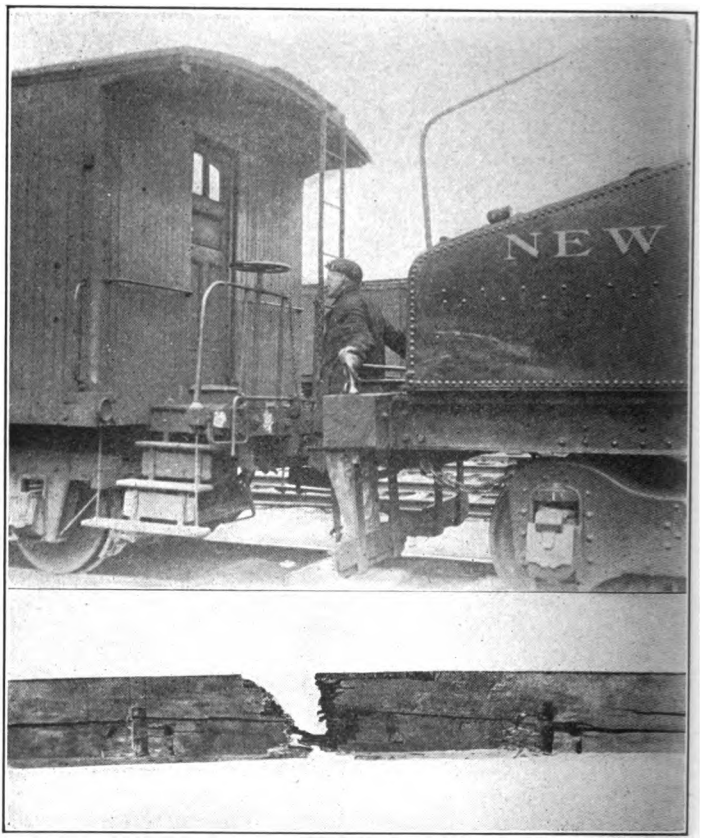

FIGS. 57 and 58.

Fig. 58 shows end sill which broke due to sudden stop of train when an employé was riding in the position of the man shown in Fig. 57 resulting in serious permanent injury.

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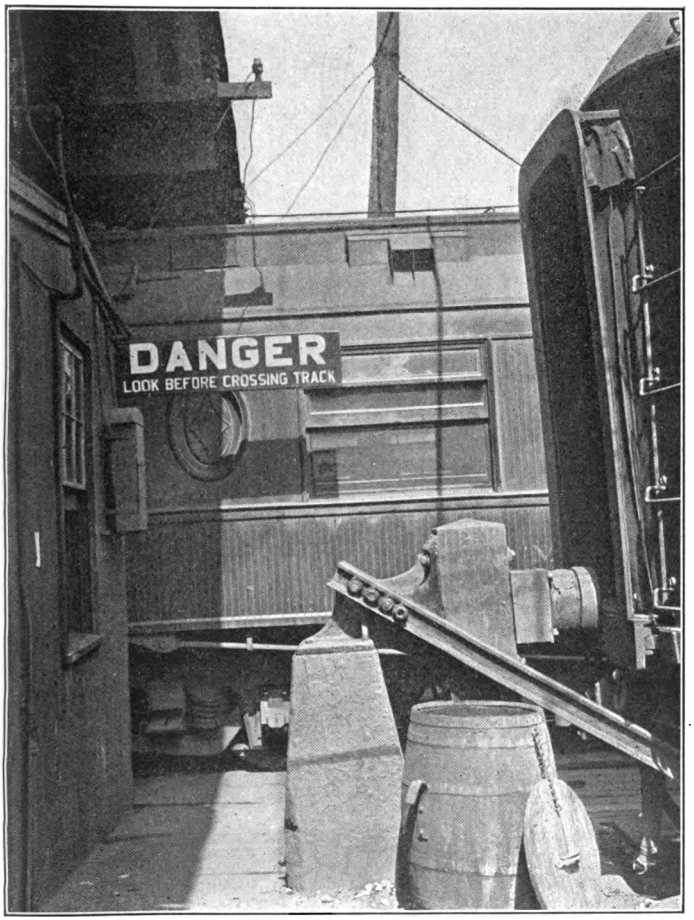

FIG. 59.

Bumping post opposite and about three feet distant from building occupied by employés. This is an unsafe condition because cars are frequently moved with sufficient force to break down such posts and run into the building. It is best to allow a distance of at least one-half car length between building and any bumping post opposite.

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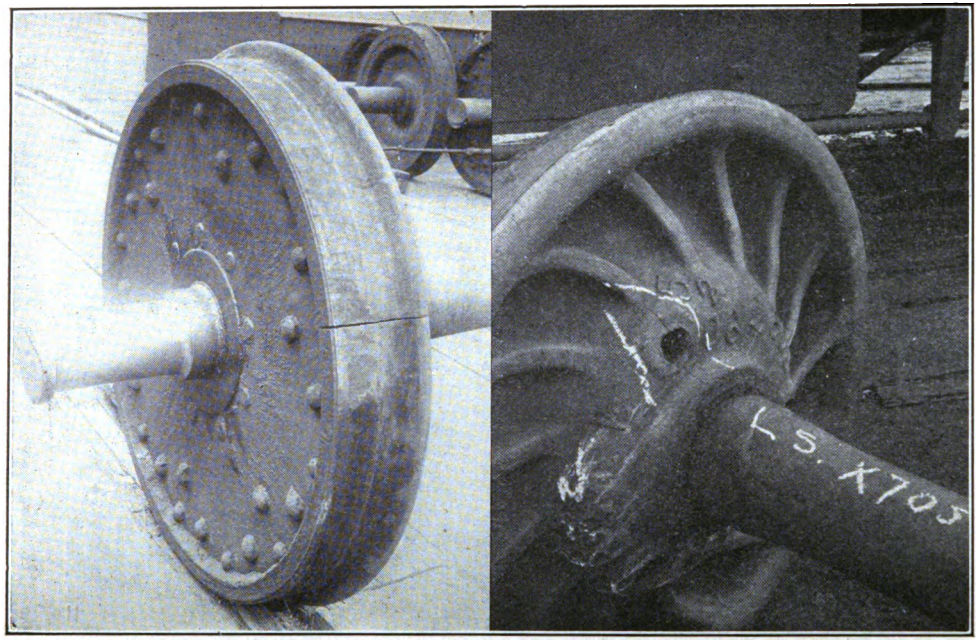

FIG. 60.

Careful inspection (in one instance at night) detected the small cracks in these wheels and most likely averted serious train accidents. Many wrecks which don't happen are due to the competent and faithful car inspector.

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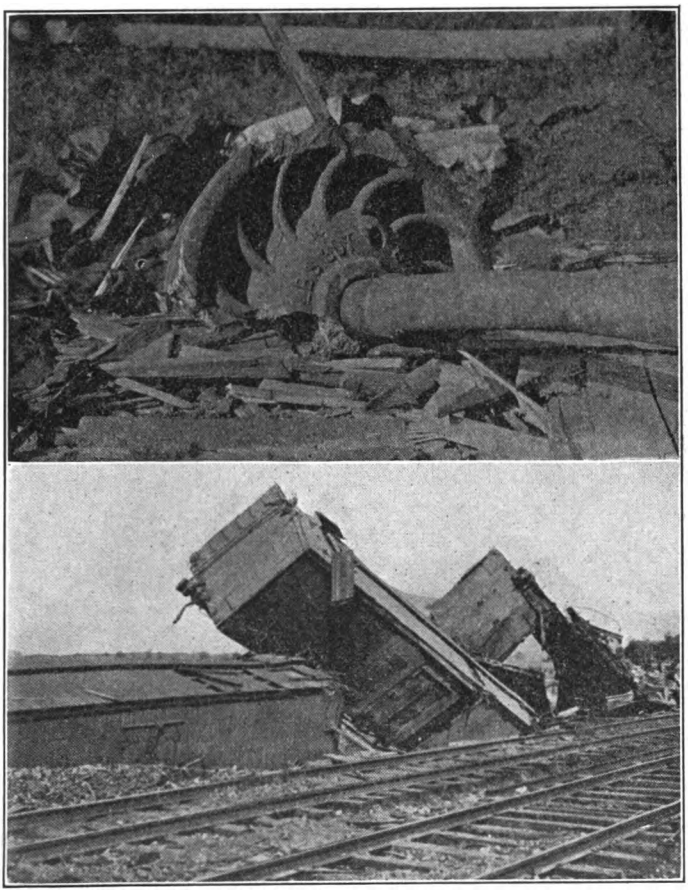

FIGS. 61 and 62.

And many which do happen are due to the other kind of car inspector. Which class do you belong to?

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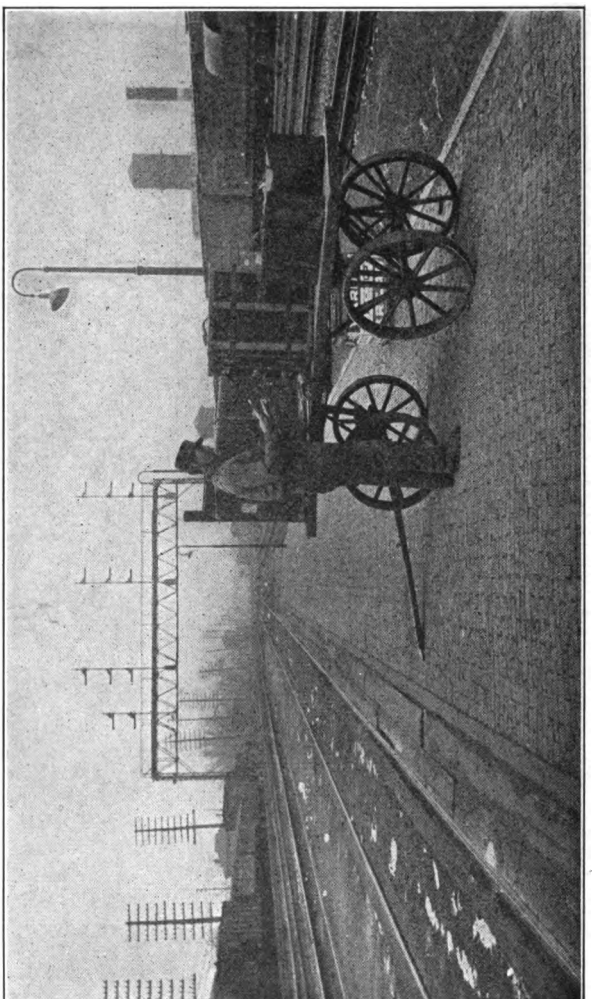

Fig. 63.
He fails to hook up the tongue of the truck.

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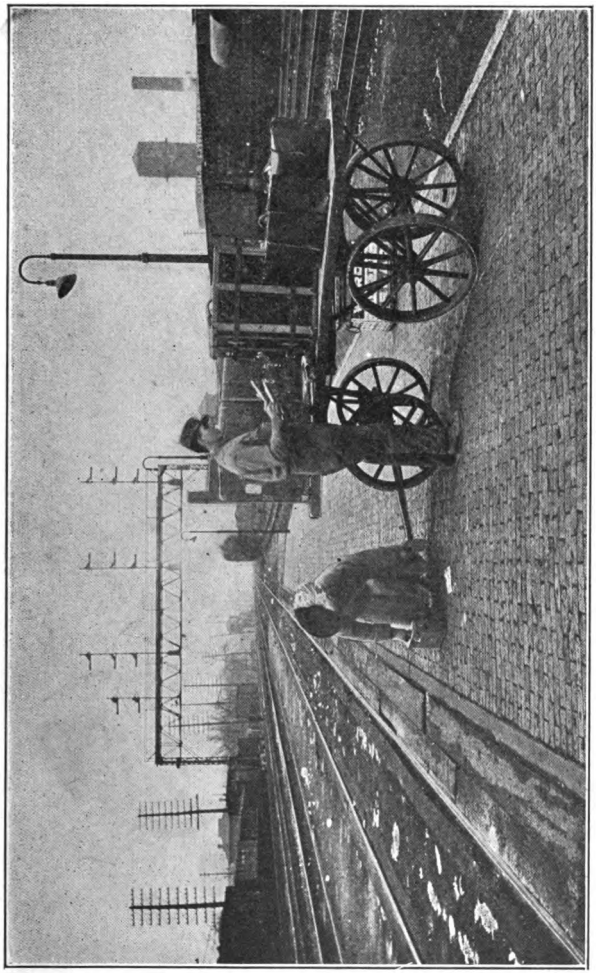

FIG. 64.
And this is what happens.

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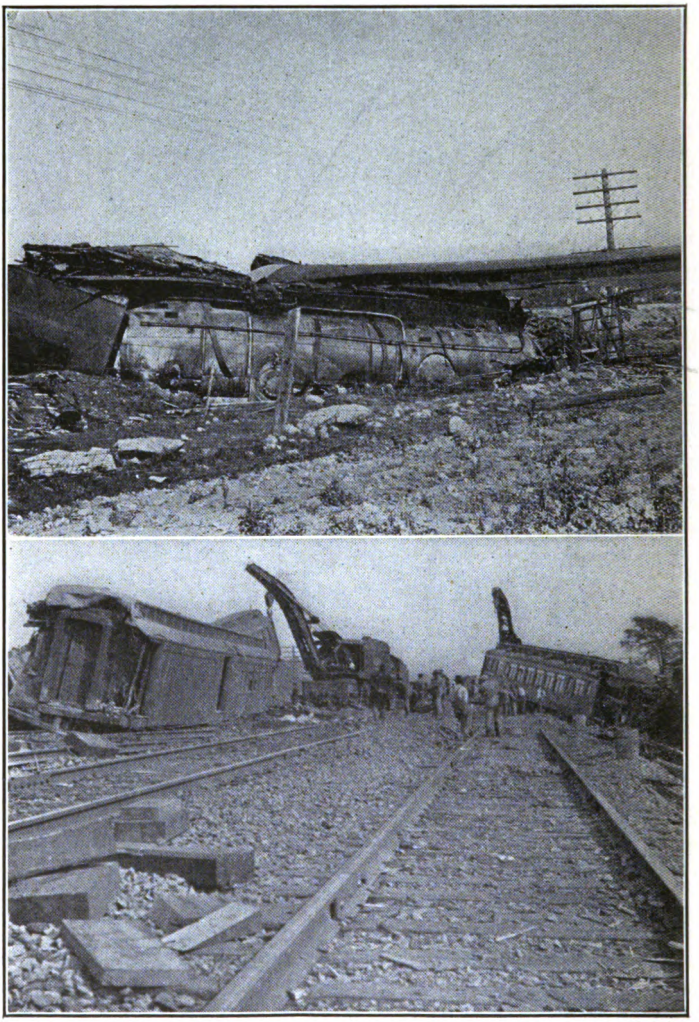

FIGS. 65 and 66.

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Scenes like those shown in Figs. 65 and 66 have been due to "the green man." One risk that cannot be eliminated in railroad operation is the "new man." Even with the greatest care in selecting and training men as to duties, experience is absolutely necessary "to make railroad men." The risk of the new man can, however, be greatly reduced by thoughtfulness and patience on the part of older men with whom he works in showing and explaining things to him. First of all, set him a good example by diligence and faithfulness in the performance of your own duties. Remember he is watching you and will likely do as you do rather than as you tell him to do. Many a successful railroad man, both in the ranks and among officials, can be found to-day who owes his success, in a great measure, to the good influence exerted in those first trips by some engineman or conductor.

They started him right and he kept right.

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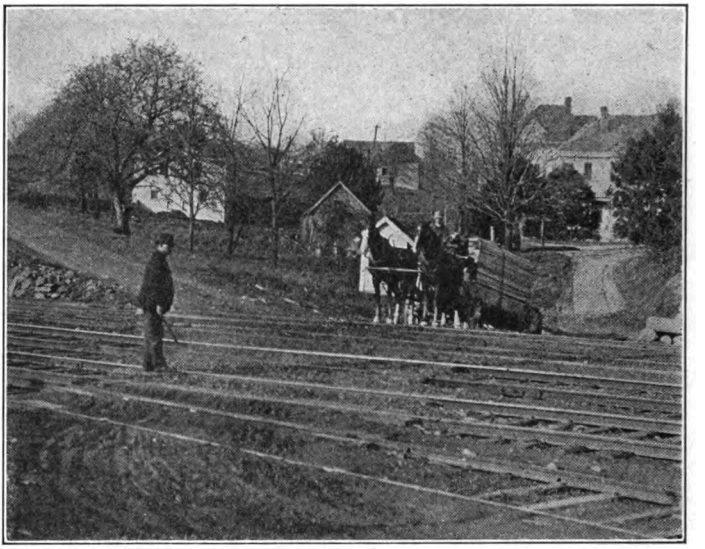

FIG. 67.

Improper flagging at a highway crossing.

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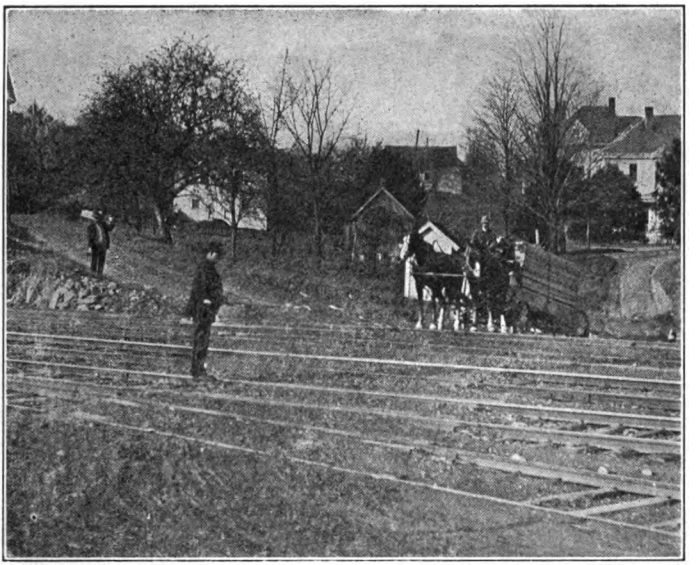

FIG. 68.

A better way.

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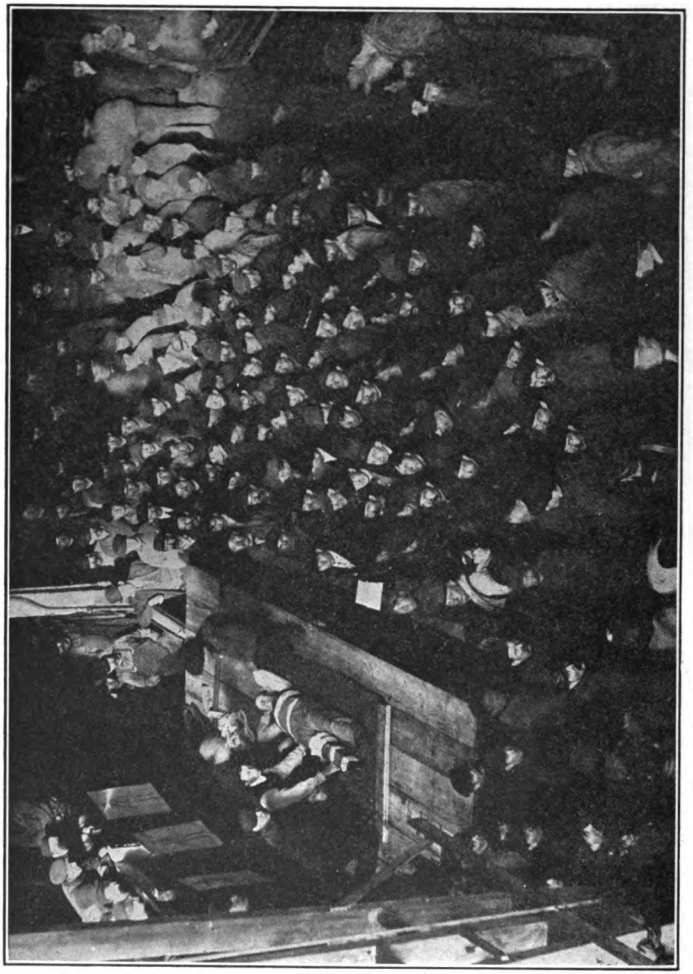

Fig. 69.

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Figure 69 shows a lesson in first aid to the injured. Railroad employés, especially those in the train, track and shop service, should have some knowledge of the elements of anatomy, circulation, respiration and kindred subjects, in order to be able to render first aid. This fact is now well recognized and many roads and industrial corporations provide the means of securing this knowledge. This picture is shown here to call the matter as forcibly as possible to the attention of employés in the hope that all who see it will give serious consideration to the subject and avail themselves of every opportunity to secure information of this mature. Many a man owes his freedom from permanent injury and even his life to prompt and proper aid given by some "layman" before professional attention could be secured.

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SHOP INJURIES AND SOME OF THE MEANS OF PREVENTION

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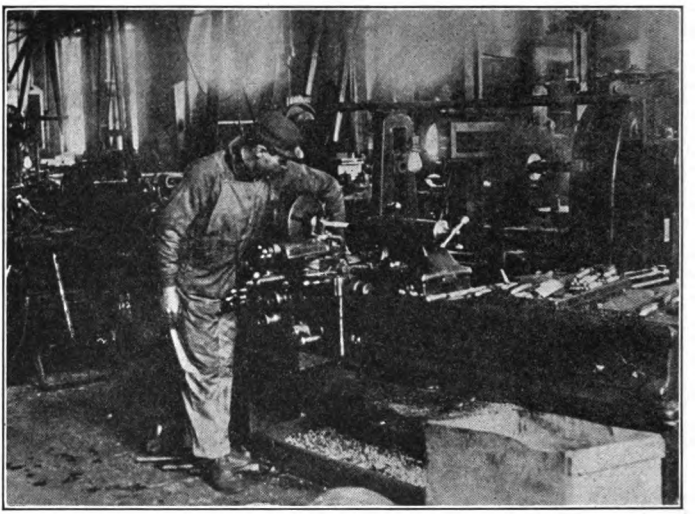

FIG. 70.

Machinists sometimes incur needless risk, as shown by the man in the picture, by the nature of the clothing they wear. They must necessarily come in close contact with movable parts of machines, all of which cannot be enclosed by guards, and loose, baggy clothing, especially sleeves, are liable to get caught by machinery and the operator drawn into the machine. Injuries due to this cause are by no means infrequent. Men engaged in this class of work should wear snug smooth-fitting apparel with short sleeves. Rings should be removed from the fingers and watch chains not permitted on outside of clothing.

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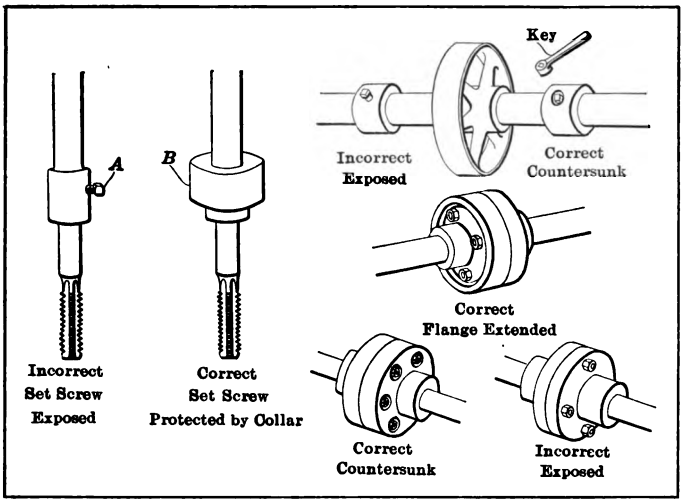

FIG. 71.

Exposed set-screws and bolt heads on revolving spindles are responsible for many injuries by catching the clothing and drawing workmen into machines. The illustrations in Fig. 71 show the danger and the methods of protection.

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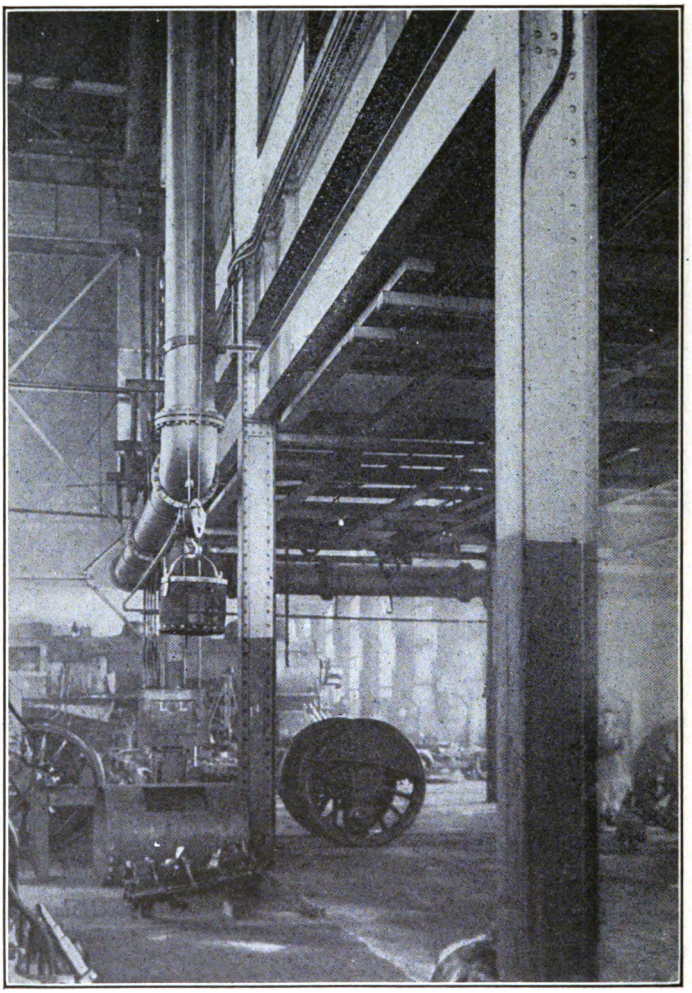

FIG. 72.

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Figure 72 shows material being raised and lowered over an open passageway in shops where employés walk beneath. There is great risk of injury from conditions of this nature. The floor space beneath should be enclosed by railing or otherwise. It is not sufficient to depend on signs warning men of the danger. If the hoist is of a permanent nature it should be properly protected. If of a temporary nature and not protected, someone should be stationed to see that employés do not walk in the danger area.

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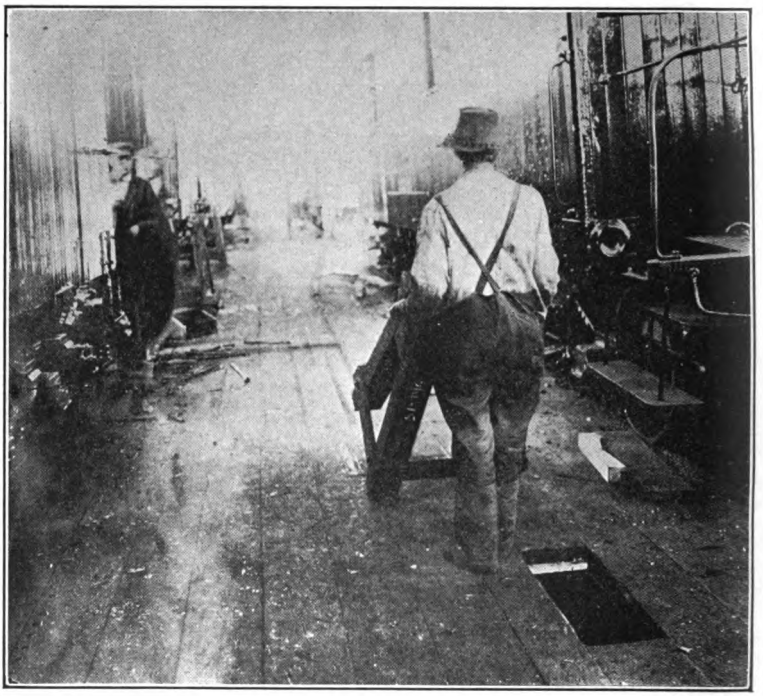

Fig. 73.

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Figure 73 shows how little conditions which are often overlooked can cause serious results. The piece of board had been laid aside for only a few minutes while the man who was engaged in repairing the floor went to another part of the shop. In the meantime an employé walking in the manner shown, stepped into the hole and the horse which he was pulling after him fell on him resulting in his death. In shops, where large numbers of men congregate, of all places, conditions of this nature should not be permitted to exist.

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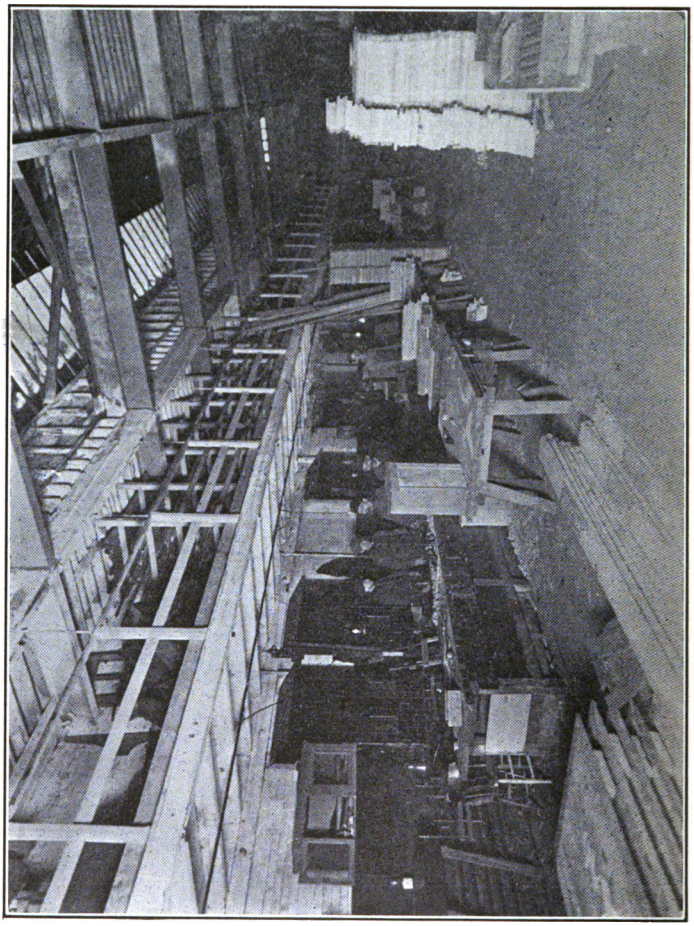

N. Y. C. & H. R. R. R. Fig. 74. (Courtesy Central Ry. Club.)

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A simple device called "a toe board," as shown in Fig. 74, at edge of balcony floor to prevent material, tools or other objects from falling or being pushed off where some one may be injured. All scaffolds, balconies and platforms beneath which men may have occasion to walk or work should be protected in this way.

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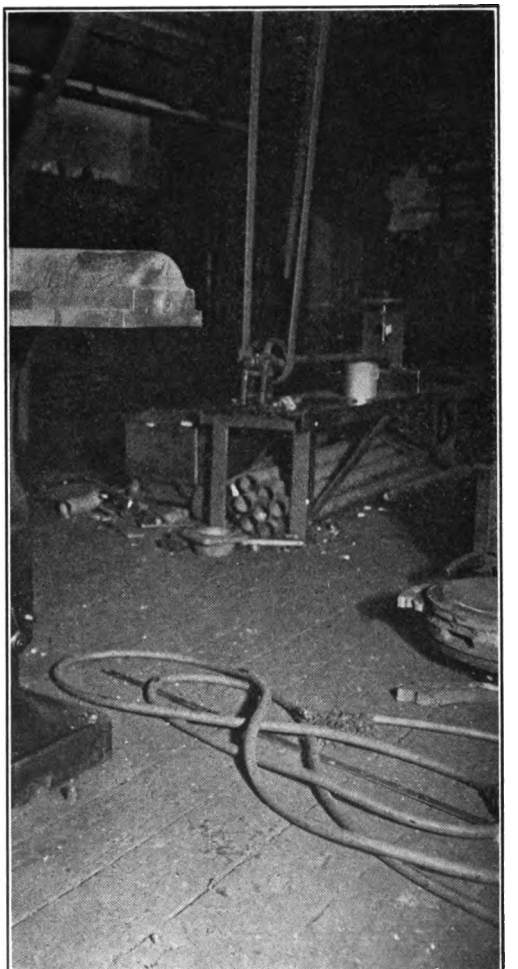

FIG. 75.

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A common cause of injury in shops and roundhouses is stumbling and falling over material, tools and rubbish left in aisles and passageways. Fig. 75 shows an air hose which caused a shopman while hurrying along, to trip and fall seriously injurying his knee. This is only one more of the many instances of how little things to which we ordinarily give slight attention may cause serious results.

It is not at all a difficult matter to keep aisles and passageways clear if all employés in the shop have their attention called to the necessity of doing so. Throwing things down anywhere is a bad habit which should be avoided in shops as elsewhere. Besides, more work can be done in a shop where employés can move freely without having to pick their way to keep from stumbling.

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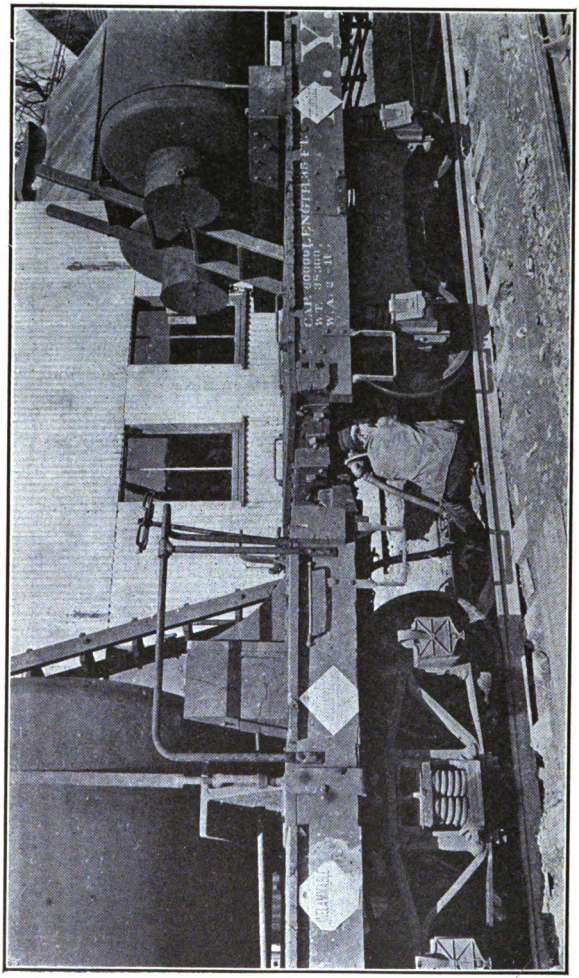

FIG. 76.

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Figure 76 shows a car repairer making "just a little quick repairs" between cars without putting out the signal protection required by Rule No. 26. He knows the rule tells him just as strongly as language can make it to protect himself *at all times*, but he thinks it unnecessary in his case and he takes a chance —and an injury.

Only a few days ago a car repairer in a large yard had about five minutes' work to do on a car which stood on one of the principal tracks in the yard. He saw no engine near and thought he had plenty of time to do the work without placing the blue flag. While he was at work an engine suddenly shunted some cars in and to-day he is minus his right hand. Any number of instances of this nature could be cited.

You cannot afford to take any liberties with Rule No. 26. Your life depends on compliance with that Rule.

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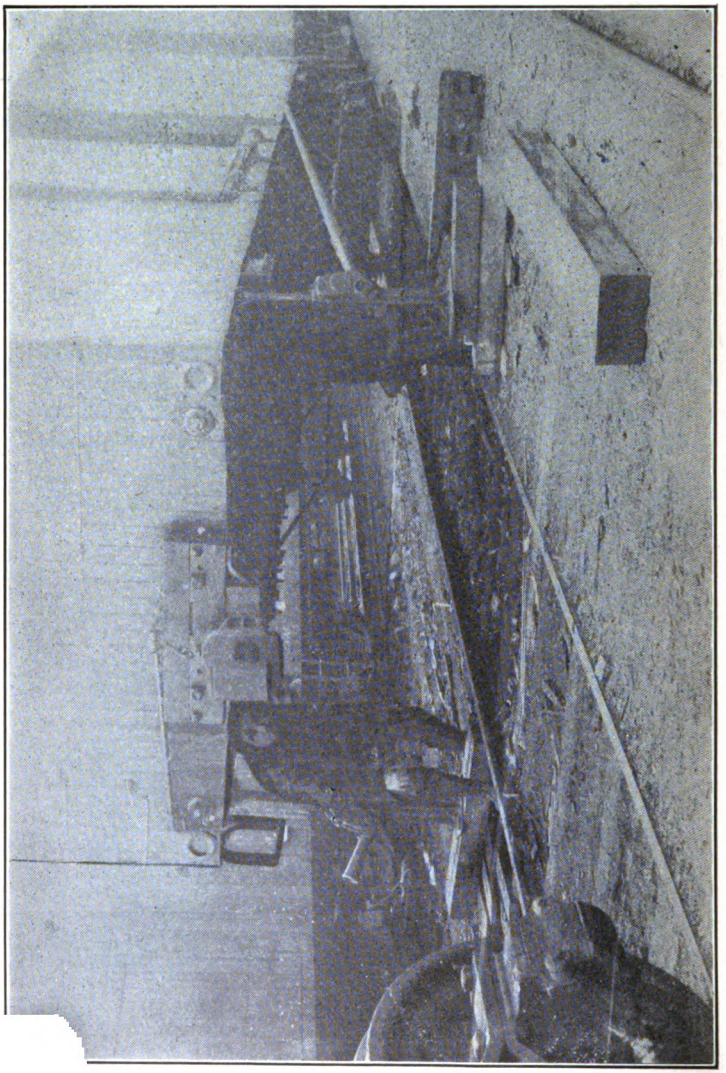

FIG. 77.

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Figure 77 shows a man making repairs under car supported only by jacks. This is very risky and should always be avoided. The shaking of the car by doing the repair work or any one of a number of circumstances may result in one or more of the jacks giving away and the car falling. *Always see that the car is supported by horses before you get under it.* Every repair yard should be supplied with a sufficient number of horses for this purpose and they should be strong enough to support the heaviest loaded car which there may be occasion to repair. *Do not have different sets of horses for loaded and empty cars.*

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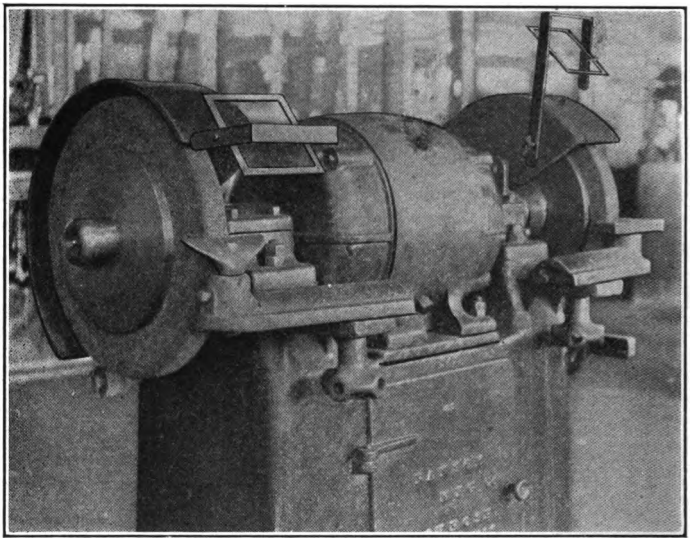

C. & N. W. Ry.

Fig. 78.

Showing emery wheel properly guarded by (1) thick strip of metal around rim of wheel; (2) cap on end of spindle to prevent the same from catching one's clothing; and (3) eye shield over rest to protect operator's eyes from flying dust. Note the shield is attached so as to permit adjustment which may be necessary on account of the nature of material being handled or on acccunt of light reflection.

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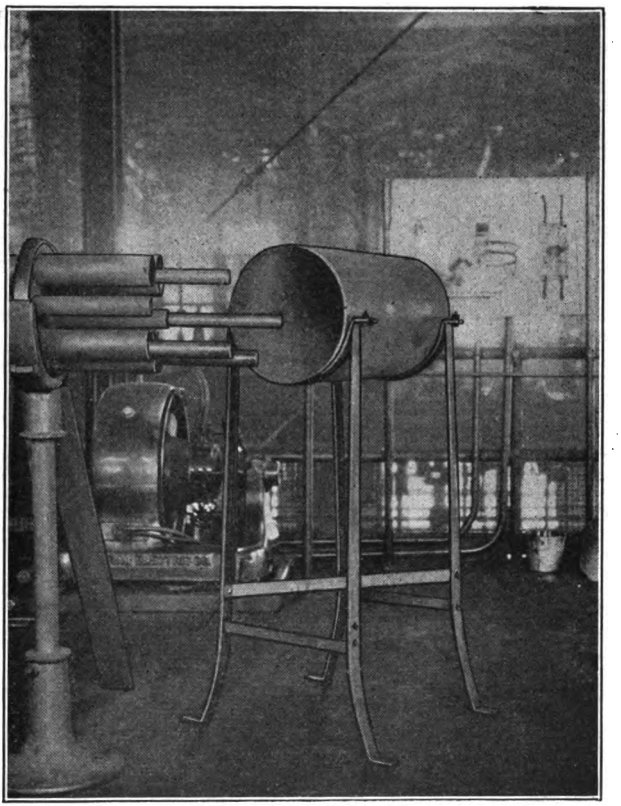

C. & N. W. Ry.

FIG. 79.

A cylinder guard for covering the exposed ends of rods the opposite ends of which are in machine.

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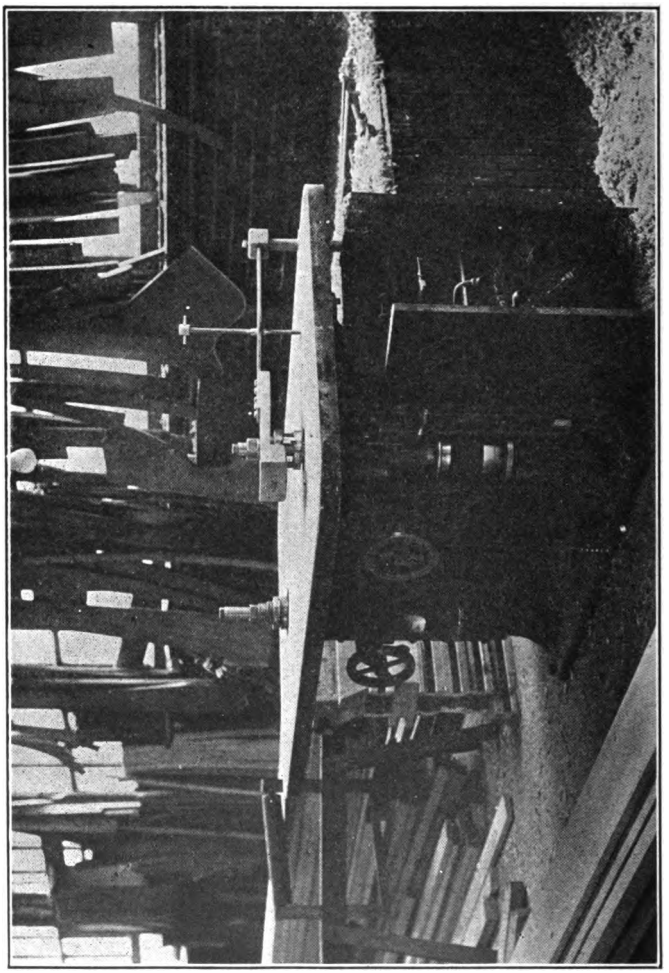

FIG. 80.—Wood shaper showing guarded and unguarded spindles.

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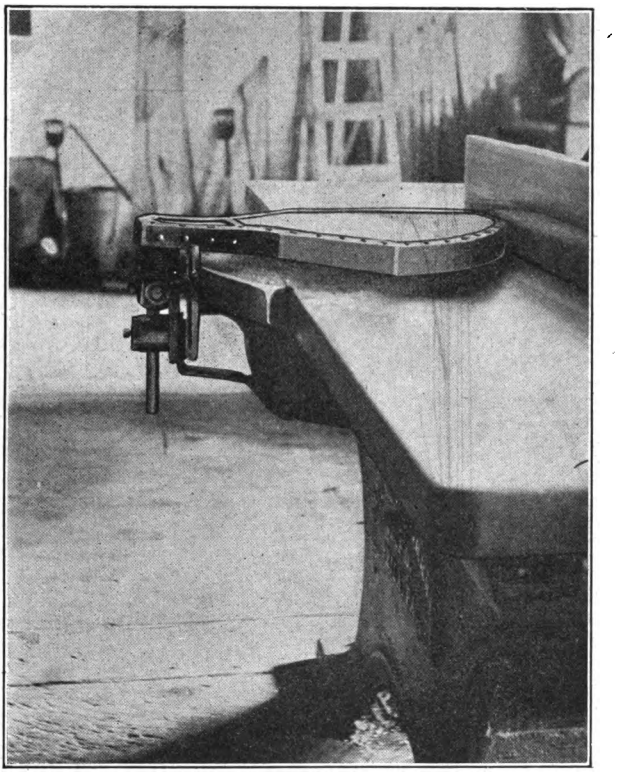

FIG. 81.

A simple, easy working guard for knives of jointer. The spring holds the guard in proper position and causes it to return automatically over the knives after material has been shoved through.

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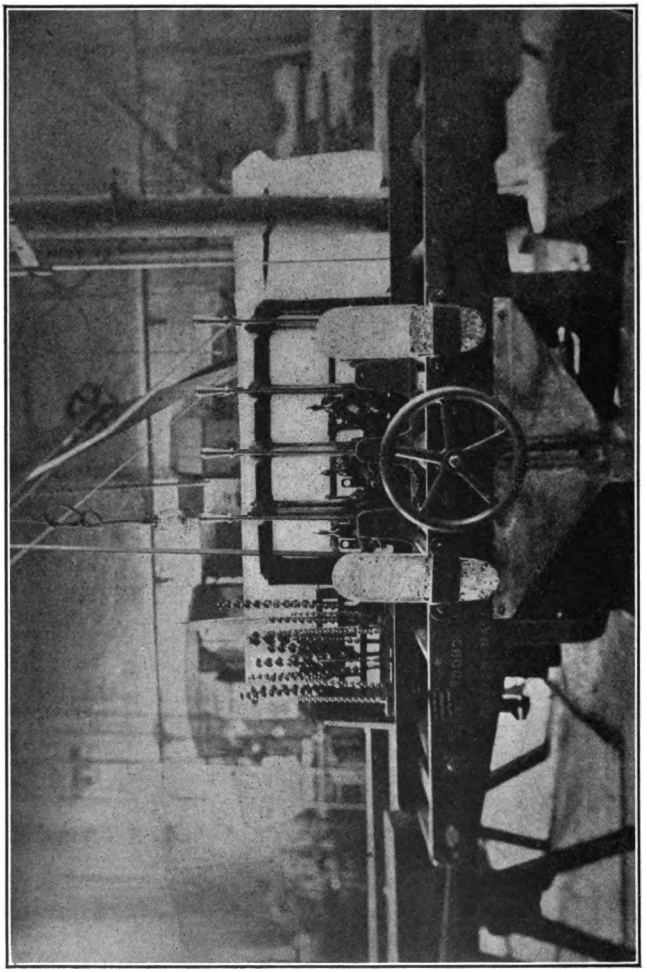

Fig. 82. *L. S. & M. S. Ry.*

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Figure 82 shows a four-spindle horizontal boring machine, with safety device consisting of two spring-hinged paddles, or stops, fastened to the side of table. These paddles are metal plated on the inner side.

This device is to prevent the bit from coming in contact with the operator of the machine in boring holes through timber. The object in having the paddles hinged is to permit the operator to lean over the table to operate handles on the machine.

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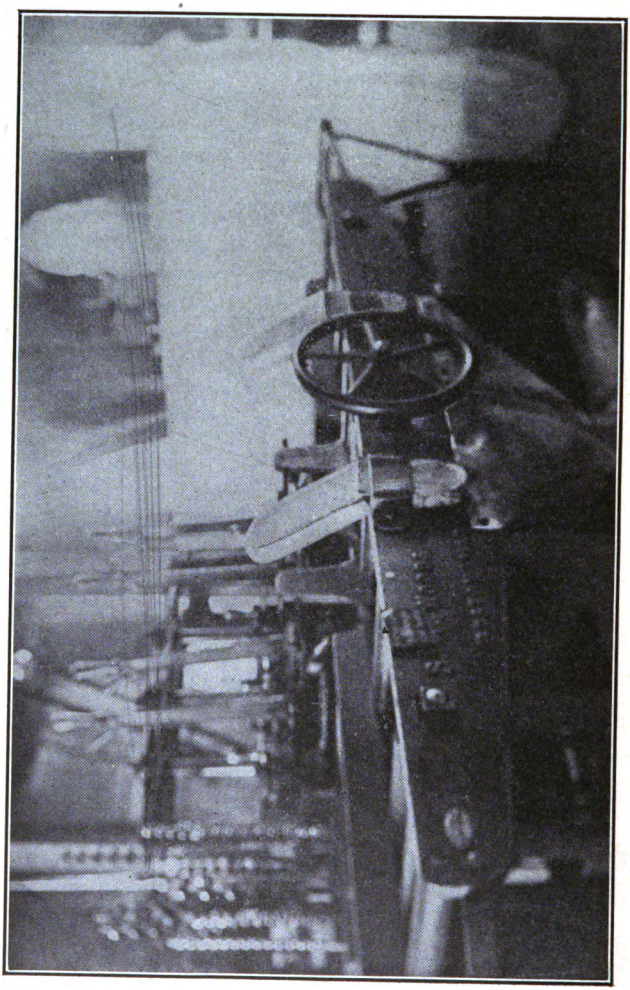

FIG. 83. *L. S. & M. S. Ry.*

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Figure 83 shows a four-spindle horizontal boring machine, with safety device consisting of two spring hinged paddles, or stops, fastened to the side of table. These paddles are metal plate on the inner side.

This device is to prevent the bit from coming in contact with the operator of the machine in boring holes through timber. The object in having the paddles hinged is to permit the operator to lean over the table to operate his handles on the machine.

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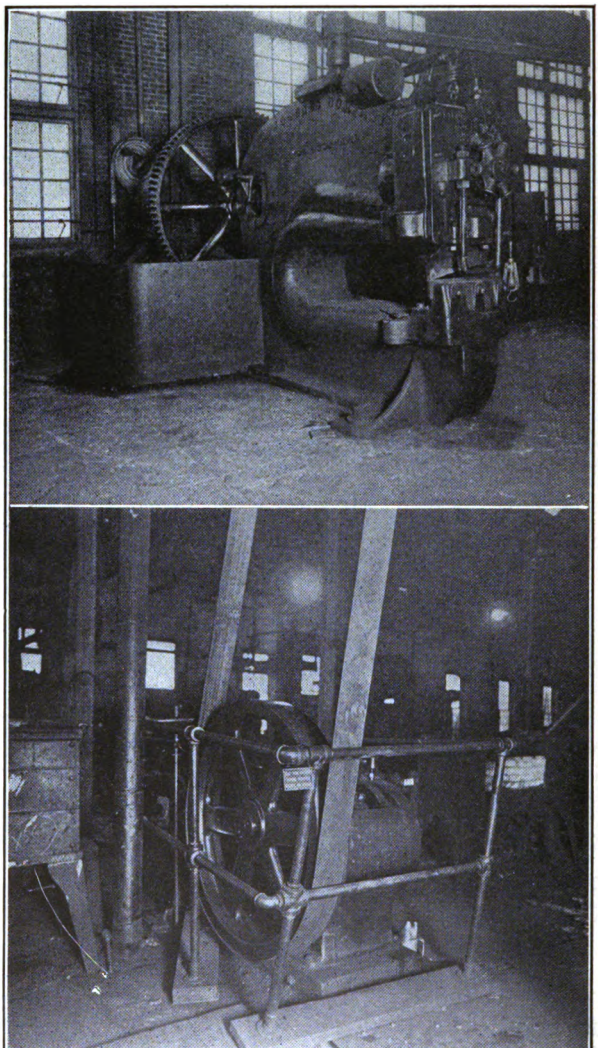

FIGS. 84 and 85.

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Figures 84 and 85 show examples of safeguards which do not afford sufficient protection. The movable parts of machines are not well enough enclosed to prevent employés being caught thereby or to prevent injury by material, such as rods or bars, being carried past machines coming in contact with wheels or belt.

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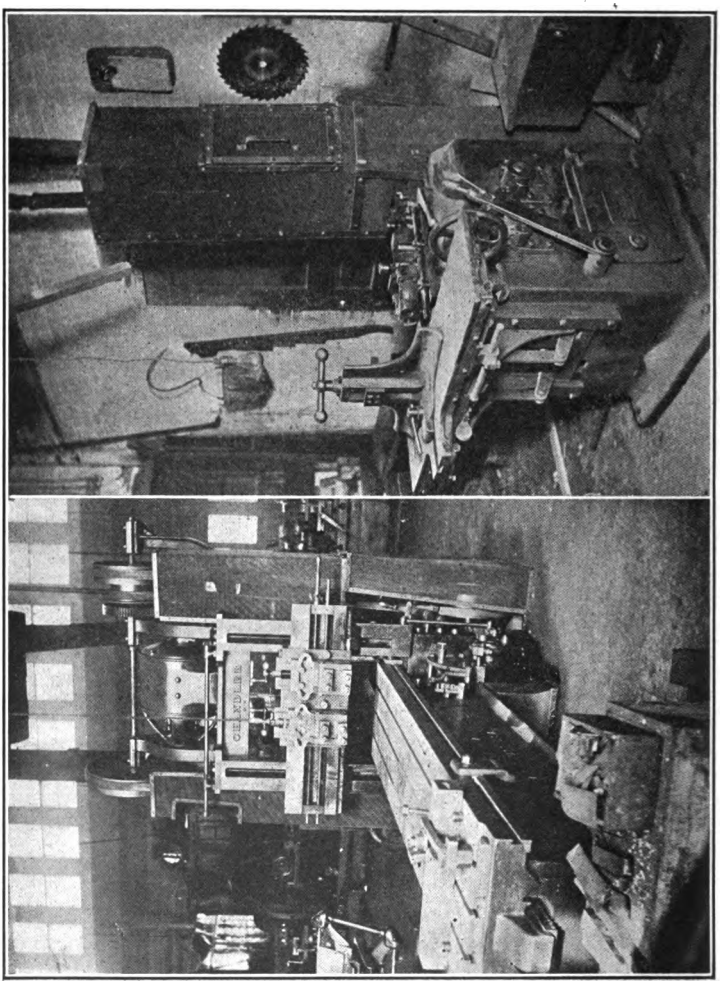

FIGS. 86 and 87. *N. Y. C. & H. R. R. R.*

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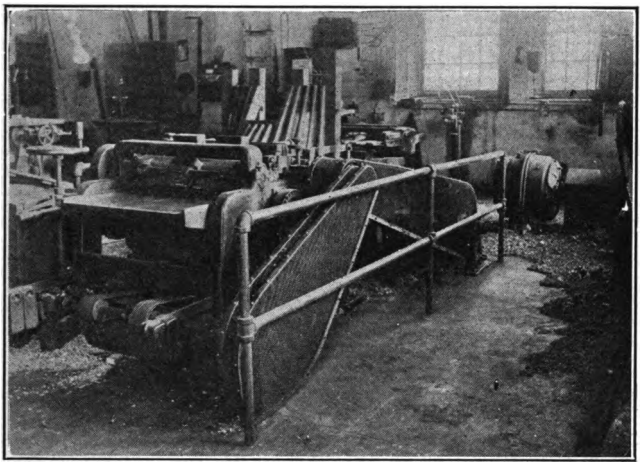

FIG. 88.

Figures 86, 87 and 88 show examples of safeguards which afford ample protection, all movable parts being completely enclosed. Note the use of woven wire which is preferable to sheet metal as such construction allows free circulation of light and air and permits a view of the machine thus enabling the operator to detect any defect before it results in a breakdown.

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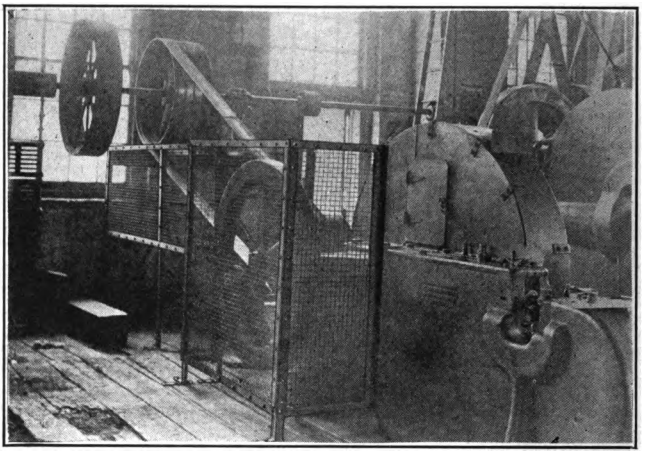

C. & N. W. Ry.

FIG. 89.

A punch machine fully protected by safeguards of modern construction. Note the use of woven wire for pulleys and the doors attached by hinges to the guards over heavy gears.

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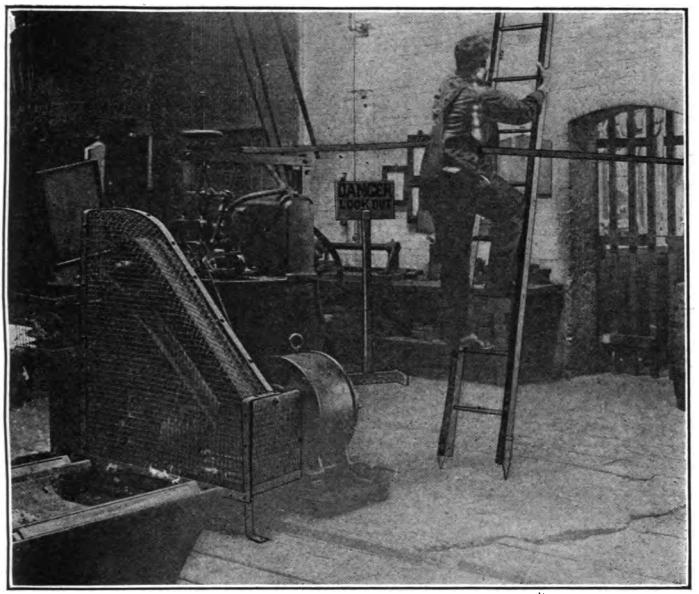

C. & N. W. Ry.

FIG. 90.

Figure 90 shows:

(1) Pulley and belt guarded by woven wire construction.

(2) Openings in bed of planer covered by sheet metal. The purpose of this is to prevent workmen from depositing tools and material in the openings which subjects them to risk of injury by movement of carriage. Ordinarily the covering may be of solid material, but if the carriage is so constructed as to permit a considerable quantity of cuttings to fall through, it may be advisable to use woven wire for covering.

(3) A workman going above to do some work. He has first placed in proper position the sign "Danger. Look Out," in order to prevent injury to other employés from falling tools or materials.

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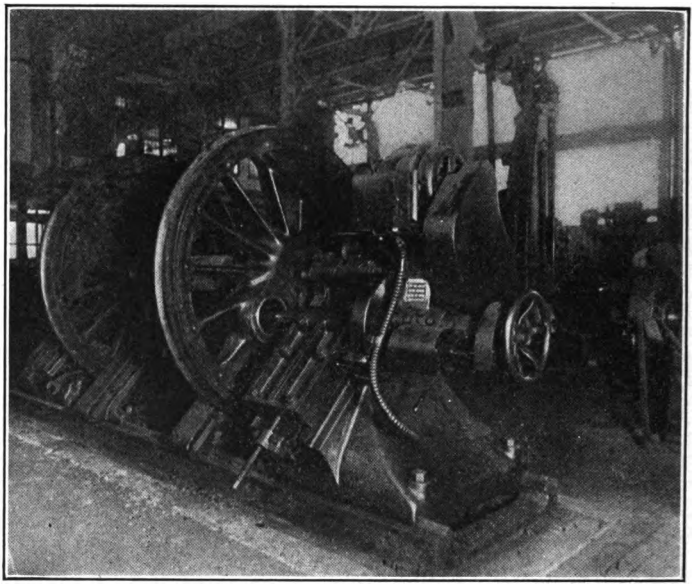

N. Y. C. & H. R. R. R.

FIG. 91.

Injuries are not infrequently due to shock from electric switch levers. These can be entirely prevented by completely enclosing the lever and points of contact by box guard in the manner shown in illustration. The enclosing material should be metal to conform to the requirements of the Board of Fire Underwriters, should be attached securely by bolts and not by hinges, a slot being allowed for projection of the lever.

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A large proportion of all injuries received by shop employés are eye injuries frequently of a serious nature resulting in permanent impairment or total loss of vision. The most common cause of this class of injuries is to be found in flying particles of dust, sparks, chips and similar objects. Experience has shown that these injuries are almost entirely preventable by the use of a few simple and inexpensive devices supplemented by personal caution on the part of employés. Some of the devices which have been found worthy are shown in the pages following.

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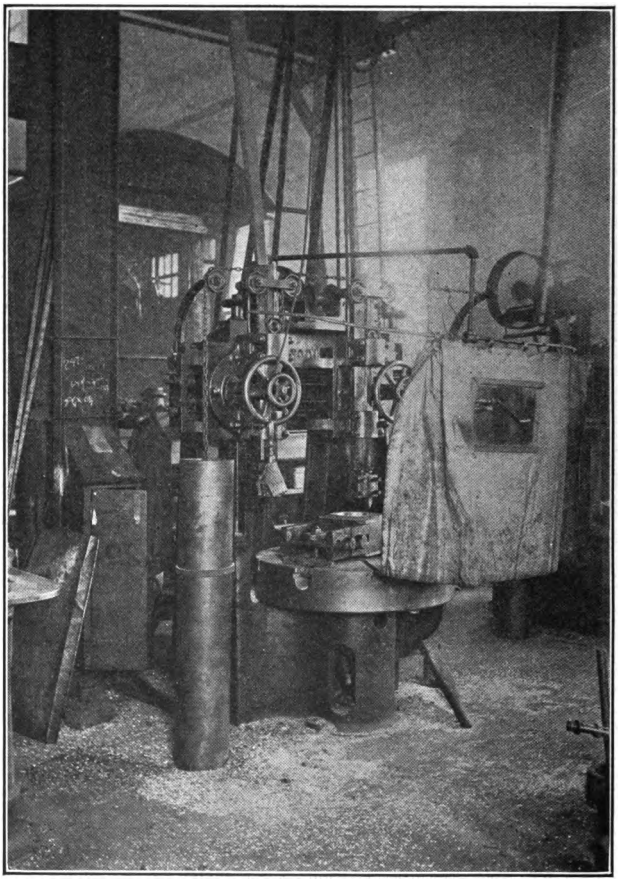

FIG. 92.

A simple and effective device for preventing injury by flying chips. It consists of a canvas bag, with a small area of glass for vision, held by movable support. Cloth is preferable for this purpose to other material, because it prevents the chips from rebounding.

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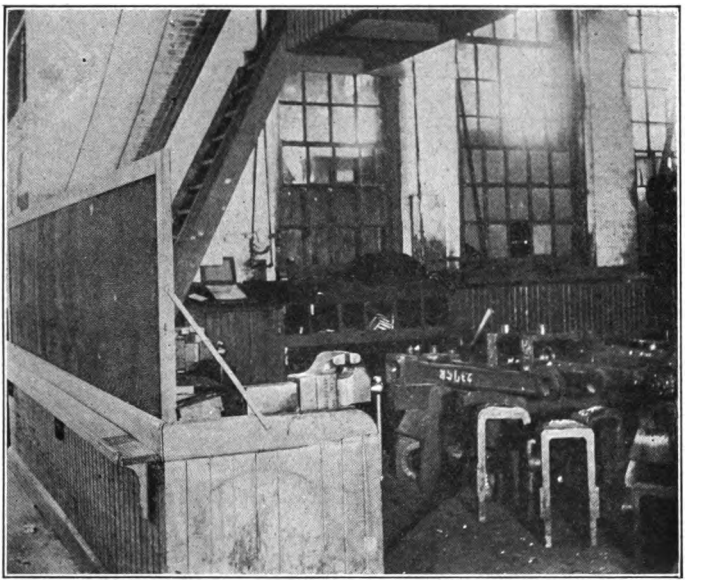

N. Y. C. & H. R. R. R.

FIG. 93.

A screen of fine wire serves the purpose where it may not be desirable to use cloth.

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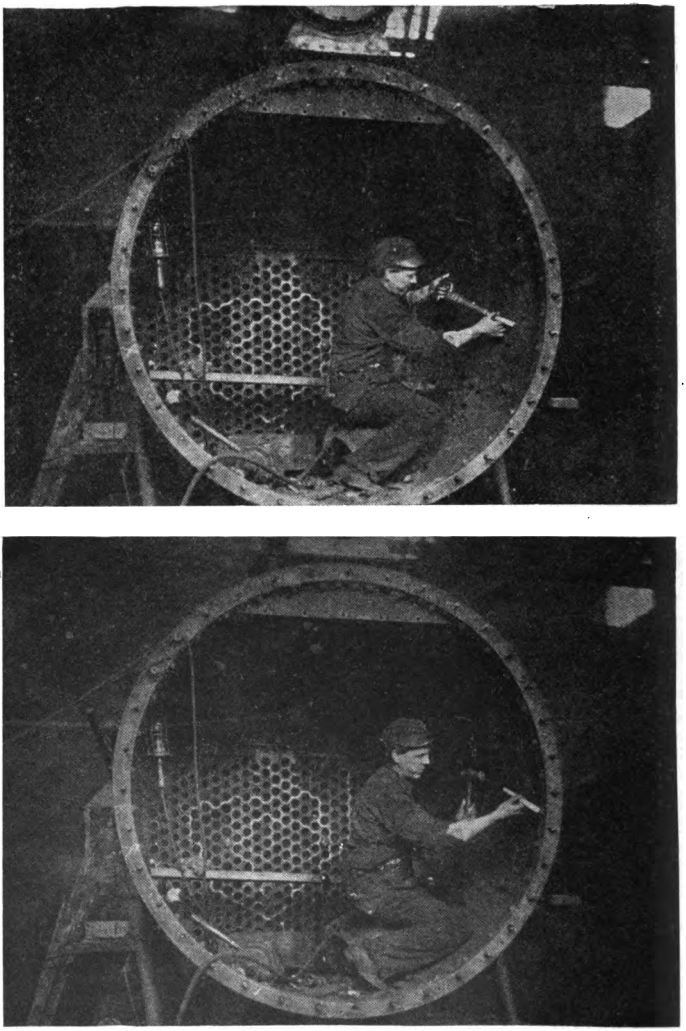

FIG. 94.

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Figure 94 shows a man striking with a hammer the head of a chisel or punch taken from an air hammer. He probably has no regular chisel or punch handy and wants to save time and trouble in getting one—which he may do at the expense of the loss of an eye. Never under any circumstances strike tempered steel with iron or similar material. Such steel is hard and chips readily and the chips sometimes fly with great force. Every experienced machinist knows this to be a fact, but the records show that they are continually taking chances and getting hurt. Stop while you have two good eyes.

This is one of the "little things" which should be explained to every machinist helper when he enters the service. Don't take it for granted that it is such a well-known fact that he must be aware of it.

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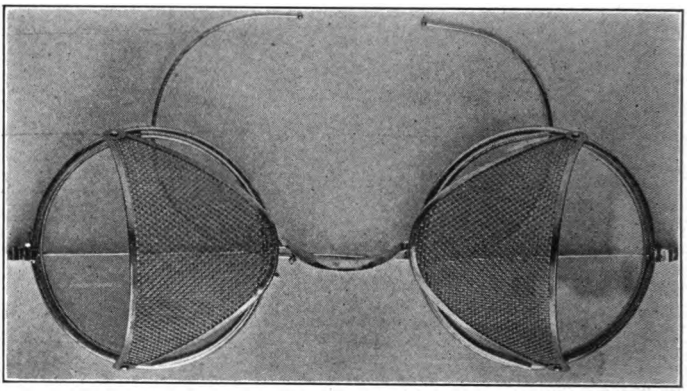

FIG. 95.

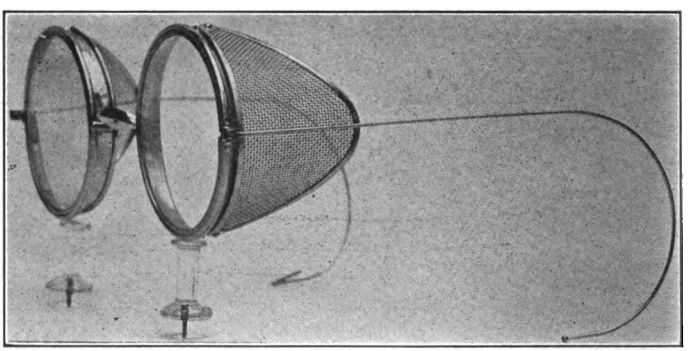

FIG. 96.

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Eye injuries to shop employés are frequently sustained while engaged in hammering metal, riveting, handling molten metal and operating emery wheels. This class of injuries from these sources can be almost entirely eliminated by wearing suitable goggles. For emery wheel operators, any ordinary style of goggles will do, since the only purpose is to keep dust from the eyes. For the other classes of service mentioned, only those goggles should be used which have been specially constructed for the purpose which requires, among other things, lenses of sufficient thickness, strength and adaptability and flanges to prevent flying chips from entering the eye from the side. On the opposite page are illustrations of a specially constructed goggle which has given general satisfaction.

In the branches of service referred to, goggles are beginning to be considerably worn and the results have been almost uniformly satisfactory. Whether furnished by the employer or the employé (in which the custom is not uniform) each employé should have his own individual pair, as the wearing of goggles in common may spread diseases of the eye. Figs. 95 and 96 show one style of goggles for the use of shopmen.

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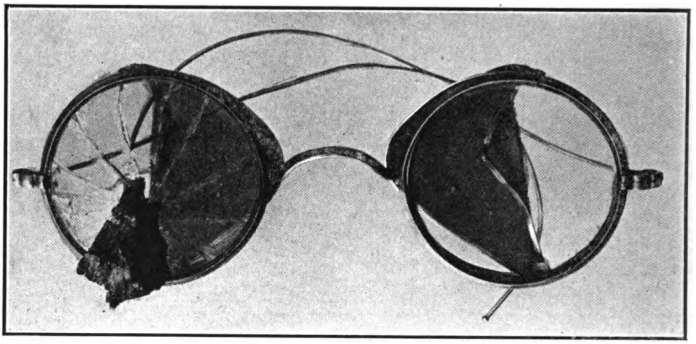

FIG. 97.

An employé of the American Steel Foundries wearing the pair of goggles shown in Fig. 97 received no injury on account of the flying chip of steel shown. Without the protection afforded by the goggles he would most likely have lost an eye.

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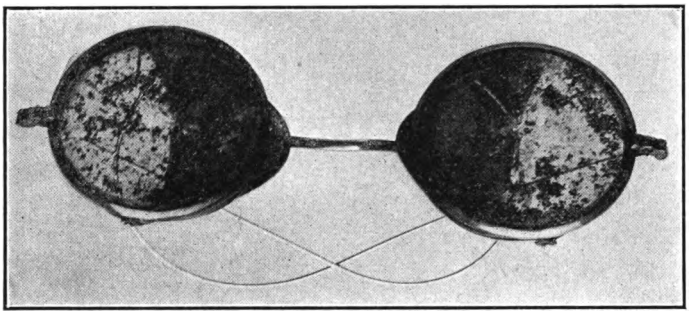

FIG. 98.

Figure 98 shows a pair of goggles which saved an employé the loss of both eyes from molten metal.

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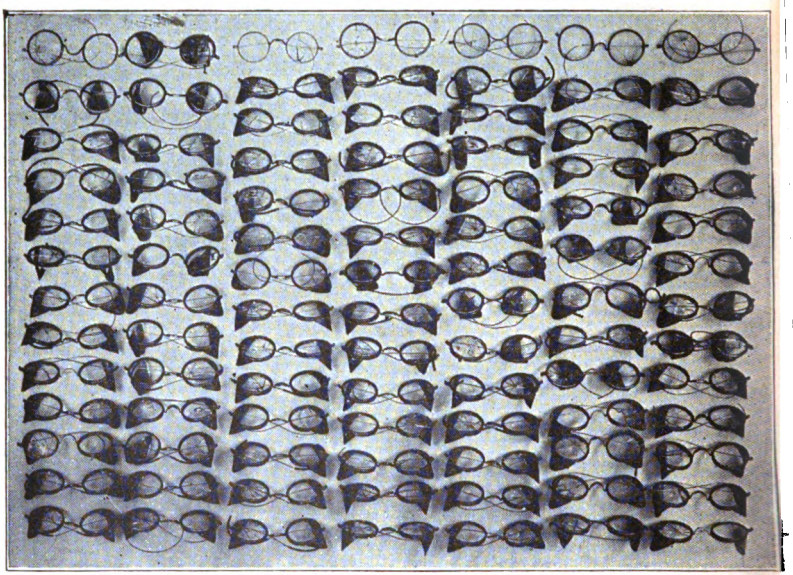

Fig. 99.

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The frequency of eye injuries ... some effective remedy for t... the illustration (Fig. ... each broken by a fly... can Steel Found... months. E... injury and ... s and the great importance of heir prevention can be judged by 99) which shows ninety-one goggles, ng chip of metal in the plants of the Ameri- ries. They were collected in a period of three ch of these goggles unquestionably prevented an many of them most likely saved the eyes.

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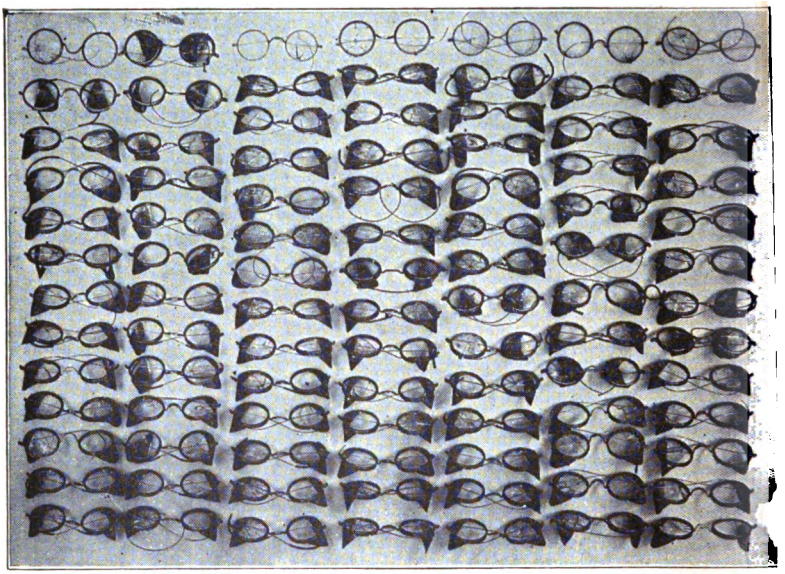

Fig. 99.

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The frequency of eye injuries and the great importance of some effective remedy for their prevention can be judged by the illustration (Fig. 99) which shows ninety-one goggles, each broken by a flying chip of metal in the plants of the American Steel Foundries. They were collected in a period of three months. Each of these goggles unquestionably prevented an injury and many of them most likely saved the eyes.

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SAFETY SPIKES

It is better to be careful a THOUSAND TIMES than to be crippled ONCE.

Check yourself up on unsafe practices. Get the Safety Habit.

When "Safety First" causes a delay it is worth it and time well spent.

The Company by which you are employed wants you to take the time—the Company's time—and do your work in the Safe Way.

After an accident has happened it is so easy to think how it could have been avoided. Let's try to think about prevention before "something happens."

After years of agitating and legislating, of theorizing and criticizing concerning railroad accidents we are beginning in truth and in fact to prevent accidents. Remember and practise "Safety First" at *All Times*.

It is not enough for railroad men to be as dilligent and careful in the performance of duty as men in other lines of work. They should be the most careful men on earth because their responsibilities are so great.

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